VOLUME I

FAMOUS AUTHORS' SERIES

No. 4

JULY, 1897 Issued Quarterly $1.00 PER ANNUM

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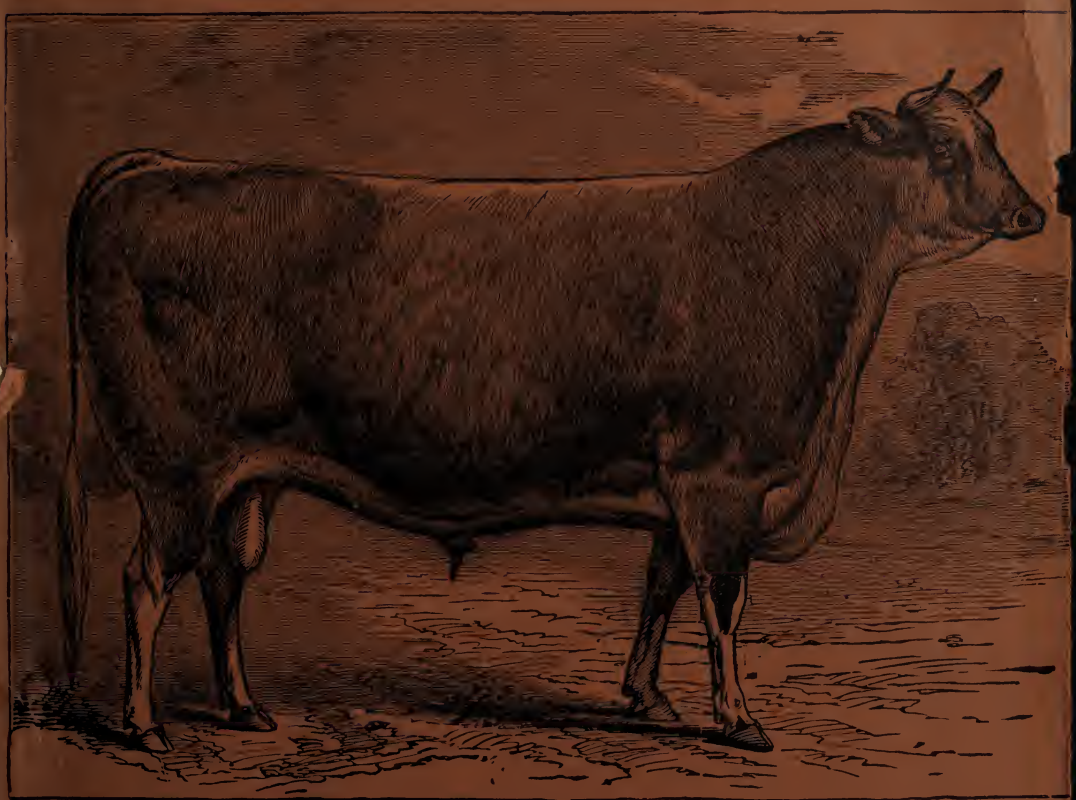
MANNING'S BOOK

. . ON . .

Cattle, Sheep and Swine



JERSEY BULL. "COMET."

THE MOST COMPLETE AND CELEBRATED BOOK ON

The Care of Stock

The Prevention of Disease

and Restoration of Heal

HUBBARD PUBLISHING COMPANY

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MANNING'S BOOK

ON

Cattle, Sheep, and Swine

GIVING ALL THE

Facts Concerning the Various Breeds and their Characteristics, Breaking, Training, Sheltering, Buying, Selling, Profitable Use, and General Care, and all Diseases to which they are Subject—the Causes, How to Know, and What to Do; Given in plain, simple language, and with Directions that are easily understood, easily applied, and remedies that are within reach of the people. Also, the Recent, Approved, Humane Methods for the Preservation and Care of Stock, the Prevention of any Disease, and Restoration of Health.

Carefully Prepared, after a ripe Experience of Twenty-five Years in Stock-raising and an Extensive Practice in Veterinary Surgery,

By J. RUSSELL MANNING, M. D., V. S.

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CATTLE.

CHAPTER I.

NATURAL HISTORY OF CATTLE.

THEIR ORIGIN——EARLY DOMESTICATION —— THE DIFFERENT KINDS AND THEIR PECULIARITIES——IMPROVED BREEDS——DEVONS——SUSSEX——SHORT HORNS——ALDERNEYS——AYRSHIRES —— HOLSTEINS —— POLLED CATTLE——KERRY COWS——THE CHEROKEE OR TEXAS CATTLE, ETC., ETC.

The native country of the *genus Bos* is not known, and the wild type has long since passed away.

The Urus is regarded as the parent of domesticated cattle, and is described in its wild state, as an animal of enormous size, of great fierceness, and fable has thrown around it an air of mystery, as is common in all legends that have come down to us from the far past.

Domestication of Cattle.

The domestication of cattle is also a matter of conjecture.

Our earliest record comes from scripture. Jubal, the son of Lamech, who lived in the lifetime of Adam, is recorded as being "the father of such as have cattle."

Noah certainly had cattle, and wherever the sons of Noah migrated, they carried cattle with them.

Cattle were worshipped by the earliest Egyptians, and among the ancient nations of Judea, they were, and still are, held in great veneration.

In the days of Abraham, cattle certainly were regularly bred, and in the days of Jacob we have an account of systematic breeding to color, and probably to type.

In every civilized nation, the keeping of cattle forms among the earliest productive industries recorded, and every Celtic nation has at one time or another represented them as divinely given, or else, like the Hindoos, held them in the greatest veneration.

Scientific Nomenclature.

According to naturalists cattle belong to the CLASS *Mammalia*; that is, having mammæ or teats; their natural order is called *ruminantia*, from their habit of ruminating, or chewing the cud.

Their TRIBE is termed *bovidæ*, meaning the ox kind. The GENUS is *bos*, the ox; the horns growing, from the crest, projecting at first sideways, and porous or cellular inside, with a film of true horn encasing the cellular bony structure inside; the SUB-GENUS, which will form the subject of what we have to say, is termed *bos taurus*, or the domesticated ox.

Of these there are many families, or sub-families; each distinctive breed being a family. Mixed breeds, grades, and crosses, may be termed sub-families.

The Teeth.

Cattle are distinguished as to their teeth by having eight lower incisors, and none upper; these are the cutting teeth. They have no canine teeth or tusks, but have twenty-four molars or grinding teeth; six on each side of the lower jaw, and six on each side of the upper jaw. The upper jaw has no incisors; but the skin upon which the lower incisors meet in the upper jaw is thickened, hard, and in aged animals almost horny. The teeth may be represented as follows; the figures above the line representing the upper, and the figures below the line representing the lower jaw:

$$\text{Cattle, incisors, } \frac{0}{8}, \text{ canines, } \frac{0}{0}, \text{ molars } \frac{6\ 6}{6\ 6}.$$

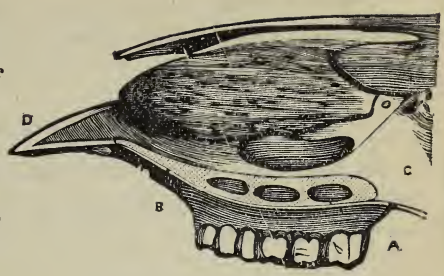
Total, 32 teeth.

We annex a cut of a section of the lower jaw showing the eight incisors, of a mature ox, or at the age of five years. Before and after this age the teeth vary very materially, as other portions of this section show.

TEETH OF OX AT AGE OF FIVE YEARS.

The annexed cut of section of the head of an ox will show the molars, or grinding teeth, and also the terminal bone of the upper jaw, corresponding to the lower face jaw, and destitute of teeth.

Explanation.—*a*—Molars or grinders. *b*—Superior maxillary bone—its palatine process. *c*—Cells of the palatine bone. *d*—Anterior maxillary bone, destitute of incisor teeth.



SECTION OF HEAD OF OX.

Breeds of Cattle.

The breeds of cattle which have acquired favor in the United States are confined to but few.

The Devons are the typical race of England, as among those that have retained their purity, through long generations, breeding with entire uniformity as to color, symmetry, horns, and other general characteristics, fully as much so as the Chillingham white cattle, which are regarded as descendants of the original or aboriginal cattle of the British Islands.

FIRST PRIZE DEVON BULL, "WILMOT."
Two Years Old.
The Property of Mr. George Rudd, Guelph, Ont.

The foregoing cut is a good illustration of a Devon bull as he appeared when but two years old. Such an animal may be regarded as a most admirable specimen.

Classification of Races.

In England cattle are divided into beef and dairy cattle. Beef cattle again are divided into long-horns, middle-horns, short-horns, and polled or hornless cattle.

Long-Horns.

Of the long-horns; the old Irish long-horns showed a striking peculiarity, which was, that their horns turned directly downward.

In Craven, England, has long existed a breed of cattle peculiar in themselves, broad in the chine, quick and easy to fatten, and noted for making excellent beef.

Under the scientific breeding of Bakewell, a hundred years ago, and his immediate successor, Leicester, long-horns acquired a wide celebrity. This was undoubtedly attained by breeding in-and-in. He was known to have done so to a remarkable degree.

With the death of Bakewell and his immediate successors, excessive delicacy of constitution began to tell, and they began to lose caste years ago, as a race.

They have left their impress, however, and, most decidedly, upon the whole family of long-horns. They became better feeders, better handlers, and made better beef than before the infusion of this blood.

They have long been superseded by the short-horn and the Herefords, and are only noticed here, as forming a part of the mixed blood of cattle, of the United States and Canada.

We occasionally see by reversion, animals among our so called native cattle, showing strong characteristics of Leicester, Hereford, Devon, the old Teeswater, the Dutch and polled cattle.

Middle-Horns.

Of the Middle-Horns the only cattle valuable in the United States, are the Devons and the Herefords, both wonderful families, in their make up, and valuable whether for beef or working oxen.

In fact the Devon is the best working ox in the world, and as beef makers their flesh is superior to that of any other breed, except the Scotch, or West Highland cattle.

Besides the Devons the other families of the Middle-Horns, are the

Sussex, Pembroke, Glamorgan, *Angelsea*, and, in Scotland, the West Highland cattle, noted for the superiority of their flesh, and which have, for many generations, remained unchanged, or improved except by selection.

Their principal value, after all, is their extreme hardiness, and aptitude to fatten where other animals would starve.

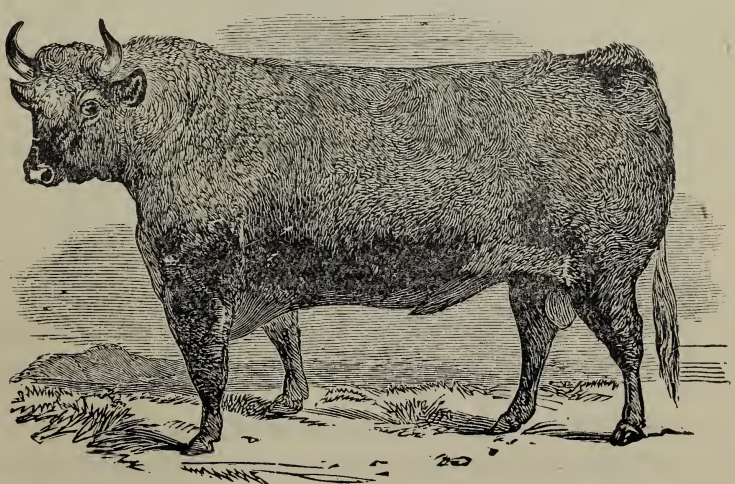
Above, as showing the characteristics of this breed, we give an illustration of a West Highland ox, in good feeding flesh.

The Devons.

The celebrity that the Devons long ago attained for their superior beef and working qualities, is wholly due to the fact that they have long been bred, in North Devon, pure. Hence, they are often called North Devon, to distinguish them from the South Devons and the Sussex, both inferior cattle, either from a feeding or working standpoint.

The Devons are undoubtedly an original and pure race, and have been noted for their high excellence for many generations.

It is only within the last two hundred years that systematic efforts have been made to increase the excellence of English cattle, and it is not more than one hundred and fifty years ago that Devon farmers were waked up to the improvement, that might be made in these high strung, generous feeders. They have within the last seventy-five years been brought to such high perfection, that they do not suffer in comparison with other high caste cattle, and they would certainly suffer by intermixture with any other breed.



THE STANDARD DEVON BULL.

Where Devons Thrive.

They cannot compete with the Short-Horns and Herefords, on flush western pastures.

They lack size, and early maturity, but on hill, or broken pastures, and in climates too cold for these breeds, and especially in climates unsuitable to Short-Horns, they are the best cattle ever known.

On the previous page, as showing the extraordinary symmetry and style of this remarkable breed, we present a likeness of a Devon bull, remarkable for eminent characteristics of the breed.

Devon Cows.

The bulls of this breed are inclined to be vicious as they get old. The cows are gentle, and if gently used, kind in the extreme. Both males and females, however, are so high strung that they will not bear abuse. A brutal master they will fight, but if managed with a firm, yet gentle hand, they are the most familiar, as they are the most intelligent, of horned cattle.

The cows give exceedingly rich milk, and many of them fair quantities.

The males are said to cross kindly with the Guernseys, and these make valuable dairy cattle.

There are however now so many excellent pure breeds of milkers that it would be futile to experiment with the cross, since it will surely reduce the value of the animal either for work or beef.

As workers, milkers and beef makers combined, for the amount of food taken, they have no superior, if they have their equal. As beef makers alone, in the West, the Short Horns and Hereford are superior. As milkers the Jersey, the Holstein and Ayrshire take the palm. As working cattle the Devons are superior to all known breeds.

The cut on the following page is a good illustration of a high caste Devon cow.

Characteristics of the Devon Cow.

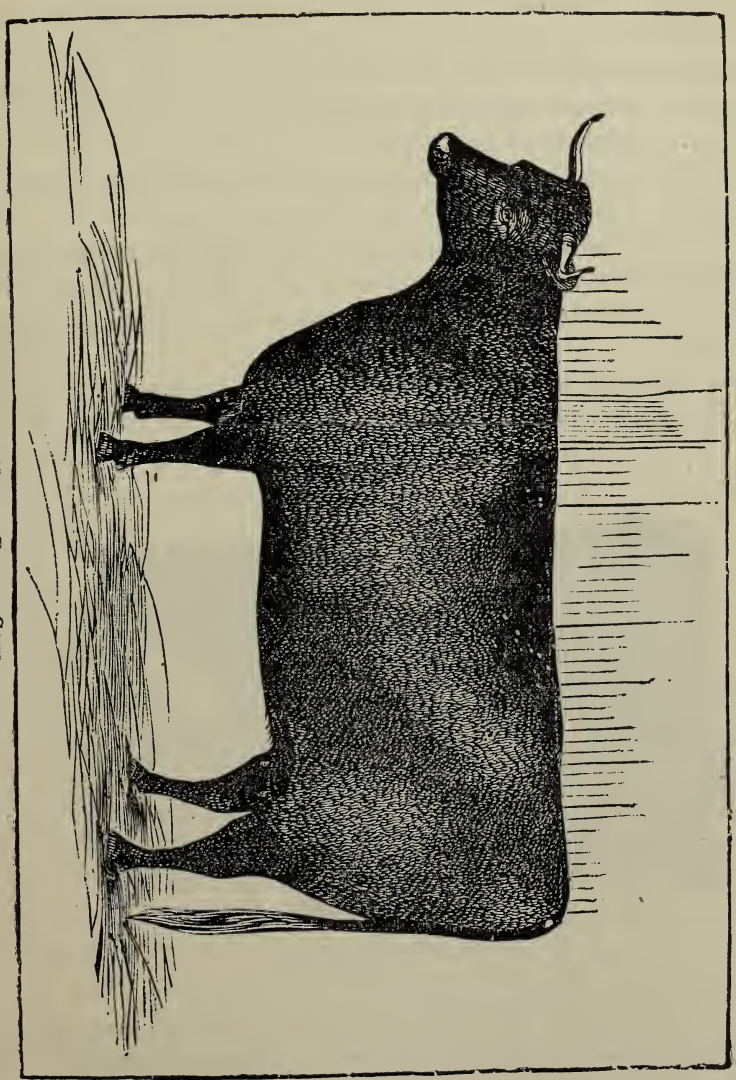
This we give as follows:

There are few things more remarkable about the Devon cattle than the comparative smallness of the cow. The bull is a great deal less than the ox, and the cow smaller than the bull.

This is some disadvantage, and the breeders are aware of it; for, although it may not be necessary to have a large bull, and especially as those of an extraordinary size are seldom handsome in all their points, but somewhere or other present coarseness or deformity, it is almost

impossible to procure large and serviceable oxen except from a somewhat roomy cow.

These cows, however, although small, possess that roundness and projection of the two or three last ribs, which make them actually more roomy than a careless examination of them would indicate.



NORTH DEVON COW.

The cow is particularly distinguished for her full, round, clear eye, the gold-colored circle around the eye, and the same color on the inside skin of the ear.

The countenance is cheerful and the muzzle orange or yellow.

The jaws are free from thickness, and the throat from dewlap.

The back, the barrel, and the hind quarters differ from those of other breeds, having more of roundness and beauty, and being free from angles.

Points of the Devons.

Youatt, than whom none have written more intelligently on domestic animals, describes the characteristics of the breed as follows:

The more perfect specimens of the Devon breed are thus distinguished:

The horn of the *bull* ought to be neither too low nor too high, tapering at the points, not too thick at the tip.

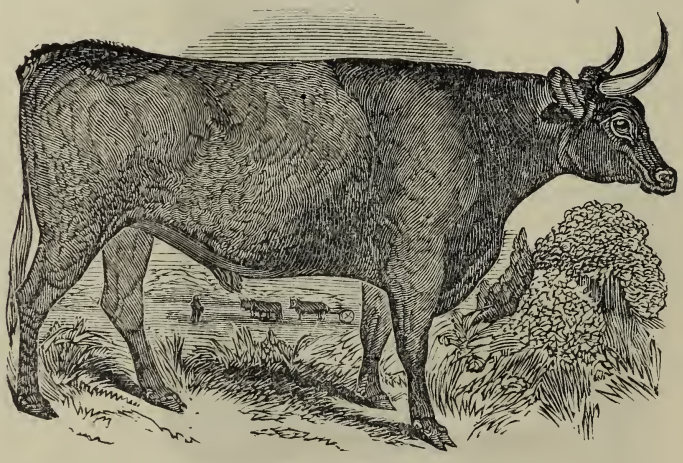
The eye should be clear, bright, and prominent, showing much of the white, and have around it a circle of dark orange color.

The forehead should be flat, indented, and small, for, by the smallness of the forehead, the purity of the breed is very much estimated.

The cheek should be small, and the muzzle fine; the nose must be of a clear yellow.

The nostril should be high and open; the hair curled about the head.

The neck should be thick, and that sometimes almost to a fault.



Devon Working Ox.

Excepting in the head and neck, the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are exceptions, however, to this rule.

The head of the ox is small, very singularly so, relatively to his bulk; yet it has a striking breadth of forehead; it is clean and free from flesh about the jaws.

The eye is very prominent, and the animal has a pleasing vivacity of

countenance, distinguishing it from the heavy aspect of many other breeds.

Its neck is long and thin, admirably adapting it for the collar, or the more common and ruder yoke.

It is accounted one of the characteristics of good cattle, that the line of the neck from the horns, to the withers, should scarcely deviate from that of the back.

In the Devon ox, however, there is a peculiar rising at the shoulder, reminding us of the blood-horse, and essentially connected with the free and quick action by which this breed has ever been distinguished.

It has little or no dewlap depending from the throat.

The horns are longer than those of the bull, smaller, and fine even to the base, and of a lighter color, and tipped with yellow.

The animal is light in the withers; the shoulders a little oblique; the breast deep, and the bosom open and wide, particularly as contrasted with the fineness of the withers.

The fore legs are wide apart, looking like pillars that have to support a great weight.

The point of the shoulder is rarely or never seen. There is no projection of bone, but there is a kind of level line running on to the neck.

Characteristics and Important Points.

Angular bony projections are never found in a beast that carries much flesh and fat.

The fineness of the withers, the slanting direction of the shoulder, and the broad and open breast, imply strength, speed, and aptitude to fatten.

A narrow-chested animal can never be useful either for working or grazing.

With all the lightness of the Devon ox, there is a point about him, disliked in the blood or riding horse, and not approved in the horse of light draught—the legs are far under the chest, or rather the breast projects far and wide before the legs. We see the advantage of this in the beast of slow draught, who rarely breaks into a trot, except when he is goaded on in *catching times*, and the division of whose foot prevents him from stumbling.

The lightness of the other parts of his form, however, counterbalances heaviness there.

The legs are straight, at least in the best herds. If they are in-kneed or crooked in the fore-legs, it argues a deficiency in blood, and comparative incapacity for work; and for grazing, too, for they will be hollow behind the withers, a point for which nothing can compensate, because it takes away so much from the place where good flesh and fat should be

thickly laid on, and diminishes the capacity of the chest and the power of creating arterial and nutritious blood.

The Limbs of the Devons.

The fore-arm is particularly large and powerful. It swells out suddenly above the knee, but is soon lost in the substance of the shoulder, which is specially full and round.

Below the knee the bone is small to a very extraordinary degree, indicating a seeming want of strength; but this impression immediately ceases, for the smallness is only in front—it is only in the bone; the leg is deep, and the sinews are far removed from the bone, promising both strength and speed.

It may be objected that the leg is a little too long. It would be so in an animal destined only to graze; but this is a working animal, and some length of leg is necessary to get him actively over the ground.

The Body of the Devons.

There is some trifling fall behind the withers, but no *hollowness*, and the line of the back is straight from thence to the setting on of the tail. If there is any seeming fault in the beast, it is that the sides are a little too flat. It will appear, however, that this does not interfere with feeding, while a deep, although somewhat flat chest is best adapted for speed.

The two last ribs are particularly bold and prominent, leaving room for the stomach and other parts concerned in digestion to be fully developed.

The hips, or huckles, are high up, and on a level with the back, whether the beast is fat or lean.

The hind quarters, or the space from the hip to the point of the rump, are particularly long and well filled up—a point of importance both for grazing and working. It leaves room for flesh in the most valuable part, and indicates much power behind, equally connected with strength and speed. This is an improvement quite of modern date. The fullness here, and the swelling of the thigh below, are of much more consequence than the prominence of fat which is so much admired on the rump of many prize cattle.

The setting on of the tail is high, on a level with the back, rarely much elevated or depressed. This is another great point, as connected with the perfection of the hind quarters.

The tail is long and small, and taper, with a round bunch of hair at the bottom.

Of the Skin and Hair.

The skin of the Devon, with his curly hair, is exceedingly mellow and elastic. Graziers well know that there is not a more important point than this. When the skin can be easily raised from the hips it shows that there is room to set on fat below.

The skin is thin rather than thick. Its appearance of thickness arises from the curly hair with which it is covered, and curly in proportion to the condition and health of the animal. These curls run like little ripples on water. Some of these cattle have the hair smooth, but then it should be fine and soft. Those with curled hair are more hardy, and fatten more kindly.

The favorite color is blood red. This is supposed to indicate purity of breed; but there are many good cattle approaching almost to bay, and others of intermediate hues.

If the eye is clear and good, and the skin mellow, the paler color will bear hard work, and fatten as well as others, but a beast with pale hair, and hard under the hand, and the eye dark and dead, will be a sluggish worker, and an unprofitable feeder.

Those of a yellow color are said to be subject to diarrhœa, or scouring.

These are the principal points of a good Devon ox; but he used to be, perhaps as many are yet, a little too flat-sided, and the rump narrowed too rapidly behind the hip bones; there was too much space between the hip bones and the last rib, and he was too light for plowing in tenacious and strong soils.

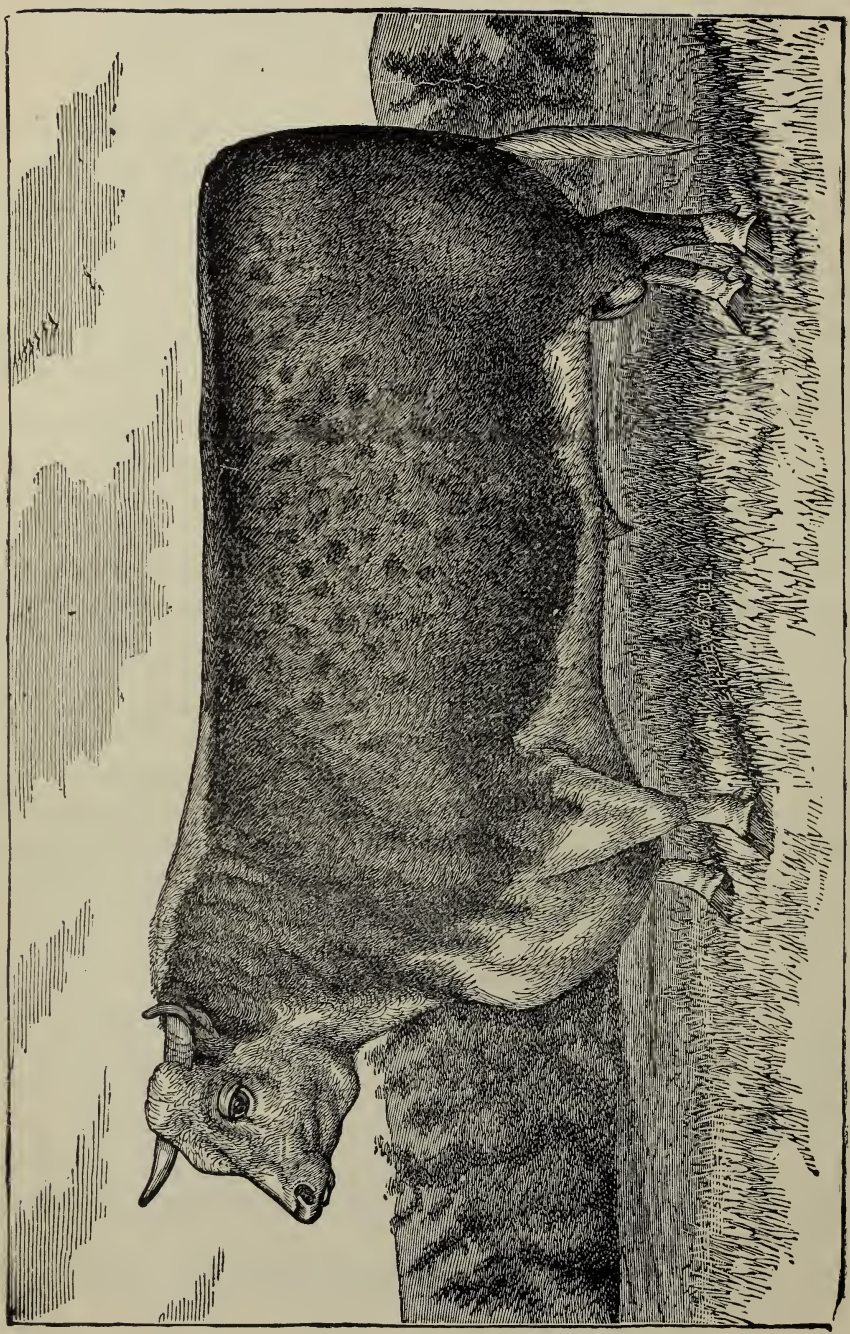
A selection from the most perfect animals of the true breed—the bone small and the neck fine, but the brisket deep and wide, and down to the knees, and not an atom of flatness all over the side—these have improved the strength and bulk of the Devon ox, without imparing, in the slightest degree his activity, his beauty, or his propensity to fatten.

The Herefords.

The Herefords, named from the county of Hereford, England, were originally red or brown, with no white about them. From that they were bred to brownish or yellowish red, some few even being brindle. Only within the last hundred years have they been bred to white faces.

It was finally made to extend along the top of the neck, along the throat, dewlap, brisket and fore legs, belly and flanks; and white hind feet and tail are now fashionable.

They are a very ancient breed, and undoubtedly allied to the Devons, which they very much resemble.



HEREFORD BULL "SIR CHARLES," BRED BY F. STONE, GUELPH, ONT.

Herefords Fifty Years Ago.

Mr. Marshal, a most competent authority, gives the following account of the improved Hereford as it was known fifty years ago:

"The countenance pleasant, cheerful, open; the forehead broad; eye full and lively; horns bright, taper, and spreading; head small; chop lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the chine; quarters long, and wide, at the neck; rump even with the level of the back, and sharp above the quarters; tail slender and neatly haired; barrel round and roomy; the carcass throughout deep and well spread; ribs broad, standing flat and close on the outer surface, forming a smooth, even barrel; the hind parts large and full of strength; neck bones snug, not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hock small; feet of middle size; flank large; flesh every where mellow, soft, and yielding pleasantly to the touch, especially on the chine, the shoulder and the ribs; hide mellow, supple, of a middle thickness, and loose on the neck and huckle; coat neatly haired, bright, and silky; color, a middle red; this, with a bald face, is characteristic of the true Hereford breed."

The Hereford Cow.

The Hereford cow compared with the ox is small and delicate, and not always handsomely made, to the superficial observer.

Here again this breed would seem to show their relationship to the Devon. She carries but little flesh, in breeding condition, and when breeding, should not be fed sufficiently to accumulate much fat; for, in order that the young be superior, the dam should have plenty of room inside.

With the Herefords, experience has shown that the dam may not be too large or coarse but she should be roomy. Then the breeder will get, even from apparently inferior cows, large, handsome steers, that will fatten early, and kindly, and to great weights.

When the cow is done breeding, and ready for fatting, it will please the owner to see how she will spread out, and accumulate flesh and fat, and this to a greater degree, than if not allowed to breed.

The Herefords are a hardy, gentle race, maturing early, and are long lived. The flesh is superior, handsomely marbled, heavy in the prime parts, and they fatten to weights fully as heavy as any known breed.

Their massive strength, honesty and gentleness make them the best working oxen known, and the potency of the bulls, when crossed upon

red or nearly red cows of the country, renders the steers easily matched in color, as they will be easily matched in general characteristics of the progeny.

Herefords in America.

Herefords were first brought to America for systematic breeding in 1816 or 1817, by the great Kentucky statesman, Henry Clay. They were soon, however, allowed to run down and were at length entirely lost sight of there. Admiral Sir Isaac Coffin, a few years after, sent out from England a Hereford bull to his friends in Massachusetts, which was used in crossing upon the native cattle of the State. He made a very marked impress there, and for many years the good result was seen in the cattle of the State.

About the year 1840 there was a large importation made into the State of New York, from England. They went principally to Jefferson county and some to Vermont.

About the year 1852 there was another considerable importation of Herefords into Ohio—very fine animals, where they, in connection with later importations, have been successfully bred.

In 1860 and 1861 two importations were made into Canada, consisting of two bulls and eleven cows and heifers, From these there have come down many most excellent animals, which have left their impress far and wide. Since that time there have been various importations, principally in Illinois and Maryland, the produce of which have fought their way against the opposition of the Short-Horns, until now they may be said to fairly divide honors with this famous breed in America as they are well known to do in England.

As Milkers.

The cows are not very deep milkers, in fact they give but little milk. They were never large milkers, and a course of breeding for many generations as beef makers, while it has brought up the animals to great weights and such wonderful symmetry that they fairly dispute the palm in the showrings with the best Short Horns, the milking qualities have gradually become less and less. It is but another exemplification of the fact, that all goodness cannot be combined in one animal.

It is enough that the science of breeding within the last fifty years has brought all our domestic animals far toward perfection, in the two great classes needed in cattle: that is, superior excellence as beef makers, or else superior excellence as deep and rich milkers. It is obvious that it must be so, for the animal superior as a milker must necessarily be altogether different in her conformation from one destined to produce a maximum weight of prime beef at the earliest age.

HEREFORD COW AND CALF.

The Hereford Ox.

Whether we consider this remarkable breed either in their adaptability to heavy draft, or in their wonderful fattening qualities, it is the steers that make the money for the feeder.

Their capability of standing fatigue and constitutional adaptability in resisting winter weather, has of late made them great favorites with the ranchmen on the plains.

So, while we see them winning honors in the show rings at home, the young bulls are eagerly picked up for transportation to Colorado, New Mexico, Montana and Wyoming, to put with the herds there, for the purpose of breeding grades.

Thus two valuable ends will be conserved: That country will send East most superior cattle for feeding fat, in the great corn region of the West, while at the same time they will be raising up steers admirably adapted to the heavy freighting business in the mountains and mining districts.

The Hereford of To-day.

As showing the extreme care that has been exercised of late years in improving this comparatively rare breed in England, to such great perfection as to fairly claim honors with the very best Short-Horns, the following extracts from leading agricultural journals, relating to one of the great show rings there in 1878, the Bath and West of England, the *Mark Lane Express* speaking of the Hereford exhibit says:

"They are not so numerous as the more fashionable breed, but the quality throughout is excellent. In the aged bull class there are five animals of which the Hereford men need not be ashamed. * * *

"The heifers in milk or in calf numbered only three, but two of them were such animals as it was worth while coming to Oxford on purpose to see. Mrs. Sarah Edwards, of Wintercott, took first and second, leaving Mr. Lutley the reserve; but Mrs. Edwards' Leonora is one of the most perfect animals that has been shown for years. It was first last year as a yearling at Liverpool, and will likely be first wherever it goes. The champion prize given by the Oxfordshire Agricultural Society was also awarded to this heifer as the best female horned animal in the yard. The companion heifer, Beatrice, is also very handsome, and took second to Leonora's first at the Royal last year, as it did last week at Oxford. Mrs. Edwards may well be proud of such stock as that; if Leonora had been a Grand Duchess Short-Horn a poem would have been composed in her honor, and translated into several languages by this time. But no Short-Horn that we have ever seen was cast in such a mould.

In the *Agricultural Gazette* (London) we find the following:

"This breed enjoyed the remarkable distinction of producing both the champion animals at Oxford. Mr. Aaron Rogers' Grateful being declared to be the best bull, and Mrs. Sarah Edwards' Beatrice (a two year old heifer) being declared to be the best cow or heifer in the yard. Both, as may be supposed, were very good, the heifer pre-eminently so. She is a daughter of the famous bull, Winter de Cote, and another instance of hereditary merit.

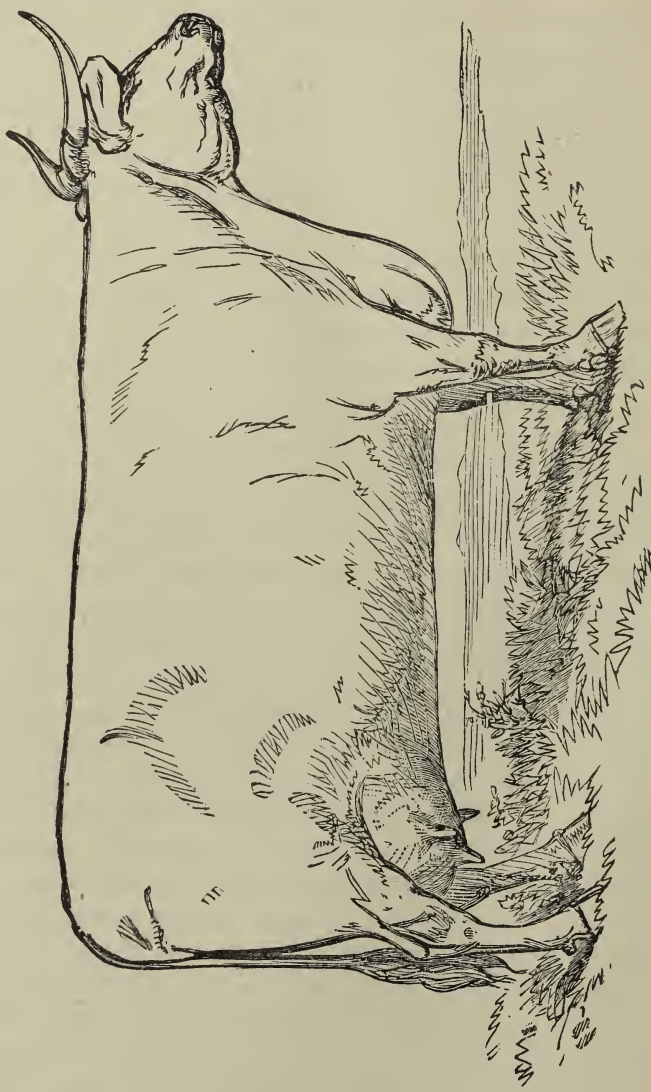
"The yearling heifers and calves indicate that this breed is, as beef makers at an early age, quite up to the highest Short-Horn standard. The Teeswater may milk better, and be more ready in adapting itself to local circumstances; but where the pasture is good, it is hard to beat the white-faces for grazing."

The *Chamber of Agriculture Journal* (London) also says:

"The old bull Hereford class produced an extraordinary animal in Mr. Aaron Rogers' Grateful, who secured the reserve at the Hereford Show in 1876, but did not make his appearance at Bath or Liverpool last year. He has made wonderful development since, appearing as a two-year-old, as is proved by the fact that Thoughtful, who was then placed above him, and has since taken firsts at Birmingham, Liverpool and Bath, has now been put second to him; and that not only was he selected by the judges as the best Hereford bull on the ground, but in the contest for the championship succeeded in carrying it off against such a Short-Horn competitor as Sir Arthur Ingram. This is no slight honor to the Hereford breed, and of course any animal counted worthy of such a distinction must be a first-class one. Grateful, at four years old, has capital loins and chines, with great thickness and depth of frame, and is very level all over; but his grand feature is the astounding mass of flesh with which his frame is covered. His girth is eight feet ten and one-half inches. Thoughtful has frequently been described in these columns, and it is sufficient to state that he is a massive, grand bull, who well supports his merit. The next class was a very weak one, only consisting of two, and those not so good as the herds of Mr. H. N. Edwards and Mr. Philip Turner are accustomed to supply.

"In the cow class the late Mr. Warren Evans' Lady Blanche, which took second prize at Bath, now came to the front position. She is marvelous at her fore flank, and displays a great mass of flesh on a well-shaped, grand frame, which, however, fell off slightly at the rump. The second prize cow, Mr. E. J. Lewis' Little Beauty, had a highly commended at Bath, and wonderfully retains her show-yard merit at eleven years old. The two-year-old heifers of Mrs. Sarah Edwards, Leonora and Beatrice, were, of course, sure to win. Beatrice has recently reared a calf, which

is slightly against her for showing; but Leonora is in full bloom with her beautiful head, symmetrical form, and all that loveliness which is so taking to the eye. After being selected as the best Hereford female on the ground, she carried off the champion prize against a remarkably



SUSSEX COW.

shapely Short-horn heifer, and one of the best Devons that has appeared for years, so that both cups were awarded to Herefords."

Sussex Cattle.—Distinguishing Marks.

This breed is closely allied to the Devons, but coarser. Their distinguishing marks are:

The horns are more tapering, pushing farther forward, and turning up more. The head is small and well formed, the eye full, large and mild in the ox, but rather wild and unquiet in the cow. The throat is clean and the neck long and thin, but coarser than in the Devon. The shoulder is wider and rounder on the withers; straighter from the top of the withers towards the back, and carries much flesh, giving too much weight to unprofitable parts. On the other hand, the barrel is round and deep, the back straight, and the back-bone entirely hidden by the muscles on each side. The heart and lungs are full and large, and the belly and flank capacious. The barrel is well-ribbed home. The loins are wide, the hip-bone low, free from raggedness, large, and well spread, and the space between the hips well filled up. The tail, which is fine and thin, is set on lower than in the Devon, yet the rump is nearly as straight, for the deficiency is supplied by a mass of flesh and fat swelling above. The hind quarters are cleanly made, and if the thighs appear to be straight without, there is plenty of fullness within.

In color the Sussex is a deep chestnut red, or blood bay. They are all lighter in color than the Devon, but in color they are fully as uniform.

The Sussex Cow.

The cows have fine hair, a mellow, rather than thin skin; a small teat; horns fine, clean, and transparent, which reach forward from the head and turn up at the tips; the neck is thin and clean; back and belly straight; ribs round and springing out well; shoulder flat, but projecting at the point.

Hips and rump wide; the tail set on level with the rump, and the carcass large; the legs are rather short and fine.

The cows are not good milkers; they are often uneasy in the pasture, and as before stated, unquiet in temper.

They have been, some of them, imported to the United States and even exhibited and sold as Devons.

This description of the Sussex is given for this reason: Those who buy Devons should be careful that they have no stain of this blood; in other words, their pedigree should be perfect.

Short-Horned Breeds.

The Short-Horn breeds of England are represented by the Durham, the Yorkshire, the Lincolnshire, the Teeswater and the Holderness breeds.

DURHAM BULL AND COW, OLD STYLE.

The Yorkshires and Lincolnshires are now but little known, being superseded by the improved breed now generally known and recognized by the name of Short-Horn, or the crosses thereof.

Their characteristics were those in a modified degree of the old Durham and Teeswater cattle.

Short-Horns Proper.

The only representation of this class worthy of notice here, are the descendants of the old Durham or Teeswater cattle, which have existed in the counties of Durham and York, from the earliest historical periods. These uniformly had short horns, were of large size, and were extraordinary milkers.

As to their characteristics, they were thin-skinned; sleek-haired; rather delicate in constitution; not mellow to the touch; coarse in offal; defective in girth forward; slow to fatten; the meat inferior, and often of a dark hue.

Excellence in the aptitude of the Short-Horns of latter years to fatten, early maturity, and mellowness of hide, go back almost one hundred and fifty years, when the Short-Horns, on the banks of the river Tees, (and hence called the Teeswater breed), began to assume the distinctive characteristics of the Short-Horns of a later period.

Short-Horn History.

Whatever may have been the origin of the cattle from which have descended the present race of Short-Horns, it is not of moment here. It is enough to know that they had been for many generations bred sufficiently pure to establish certain characteristics that attracted the most eminent breeders of the day.

Among the breeders of the latter part of the last century, and the early part of the present century, were the Collings, (Charles and Robert), Sir Henry Vane, Col. John Trotter, and Mr. Mason.

In the early years of the present century, Mr. John Stevenson, Mr. Bates, and Mr. Booth, each became celebrated for the eminence of their animals. Earl Spencer also acquired a great reputation, as the possessor of extraordinary animals, and for prices received by himself and Mr. Bates.

Since the death of the latter gentleman in 1849, Short-Horns have steadily increased in price for fashionably bred animals, running far into thousands of dollars, of late years, for a single animal, while those not so fashionably bred were equally sought at prices that would have seemed large fifty or sixty years ago.

Below may be found an outline representation of a fat Short-Horn cow.

It will be observed that this animal carries great size, a square body of great substance, while the legs are sufficient for locomotion, although from the fullness of the carcass they seem short, and that there is abundance of meat in the prime parts, including the thighs, which carry their

SHORT-HORN COW, IN OUTLINE.

fullness well down to the hocks. It will be seen that she is characterized by massiveness, smoothness, and that she shows the appearance of carrying light offal. The brisket is deep, the udder small, but compact, and

extending well forward. The rump is smooth, but broad, and without patchiness—that is, great lumps of fat standing out like blubber. The hips are broad and well covered with flesh and fat; and the loins, and indeed the whole top, exceptionally good. In fact, she is an animal carrying beef all over, where flesh may be laid on, and full of fat inside. She is a grand representative of the breed, and one that may be fattened to a great weight.

Short-Horns in America.

Mr. Allen, the editor of the American Short-Horn Herd Book on American cattle, from a very exhaustive research of importations in relation to the introduction of this most valuable breed into the United States, says:

Soon after the termination of the Revolutionary war with England, a few cattle supposed to be pure Short Horns, were brought into Virginia by a Mr. Miller. These were said to be well fleshed animals, and the cows remarkable for milk, giving as high as thirty-two quarts in a day. Some of the produce of these cattle, as early as 1797, were taken into Kentucky by a Mr. Patton, where, as little was known of "breeds," they were called, after the gentleman who brought them, the "Patton stock." They were well cared for, and made a decided improvement in the cattle of the "blue grass country," where they were first introduced. Some of this early Virginia stock also went out to the "south branch of the Potomac," in that State, a fine grazing country, which, fifty years ago, was famous for its good cattle. In the year 1796, it is said that an Englishman, named Heaton, brought two or three Short Horn cattle from the north of England to New York. They were taken to Westchester county, near by, and bred, but no results, in *pure* blood, have been traced to them.

In 1815-16, a Mr. Cox, an Englishman, imported a bull and two heifers into Rensselær county, New York. These were followed in 1822 by two bulls, imported by another Englishman named Hayne. Descendants from this Cox stock were said to be bred pure, and afterwards crossed by Mr. Hayne's bulls. The stock now exists in considerable numbers and of good quality, in that and adjoining counties.

In 1817 Col. Lewis Sanders, of Lexington, Kentucky, made an importation of three bulls and three heifers from England. They were of good quality and blood, and laid the foundation of many excellent herds in that State. In 1818, Mr. Cornelius Cooledge, of Boston, Massachusetts, imported a yearling heifer,—"Flora"—and a bull—"Cicero"—into that city, from the herd of Mr. Mason, of Chilton, in

the county of Durham, England. These were carefully bred, and many of their descendants are now scattered throughout several States. About the same year Mr. Samuel Williams, then a merchant in London, but a native of Massachusetts, sent out a bull—"Young Denton"—and some cows of the same and later importations, and their descendants are still numerous among well bred Short Horns of the present day.

The same year, Mr. Gorham Parsons, of Brighton, Massachusetts, imported a Short Horn bull—"Fortunatus"—bred by Geo. Faulkner, of North Allerton, Yorkshire, England. He was used considerably on the native cows of his State, but we have never traced any thorough-bred pedigrees to him.

In 1820, Mr. Theodore Lyman, of Boston, Massachusetts, imported a bull, which he sold to Israel Thorndike, of that city, and he sent him to his farm in Maine. Of his produce we hear nothing.

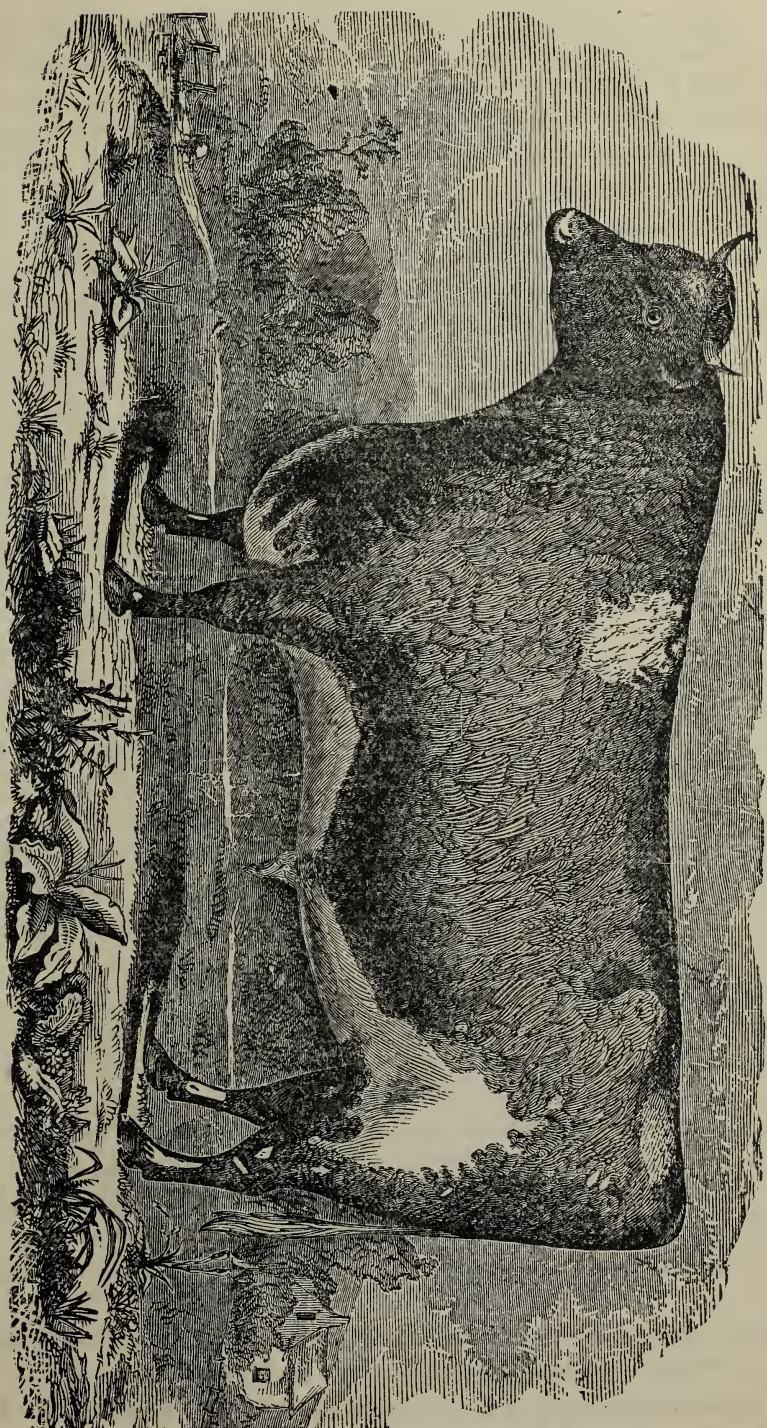
About the year 1820, and during a few years succeeding, several spirited gentlemen of Boston, and its neighborhood, imported a number of cows and bulls from some of the best herds in England. They were Messrs. Derby, Williams, Lee, Prince, Monson, and perhaps others. These were all fine cattle, and of approved blood in the English Short-Horn districts. Their descendants are still numerous in New England, and some other States.

About the year 1823, the late Admiral Sir Isaac Coffin, of the British navy, a native of Massachusetts, sent out a cow—"Anabella"—and a bull—"Admiral"—as a gift to the Massachusetts Agricultural Society. They were good animals, and bred with the other Massachusetts importations.

Shortly previous to 1821, the late John S. Skinner, of Baltimore, Maryland, imported for Governor Lloyd, of that State, a bull—"Champion"—and two heifers—"White Rose" and "Shepherdess"—from the herd of Mr. Champion, a noted English breeder. From these, several good animals descended, some or which are now known.

In 1823, Mr. Skinner also imported for the late Gen. Stephen Van Rensslær, of Albany, New York, a bull—"Washington"—and two heifers—"Conquest" and "Pansey"—from the same herd of Mr. Champion. Conquest did not breed; Pansey was a successful breeder, and many of her descendants are now scattered over the country.

During the years 1822 to 1830, the late Mr. Charles Henry Hall, of New York, imported several Short-Horn bulls and cows, from some of the best English herds. Several of these he sold to persons in the neighborhood of that city, soon after they arrived, and others he sent to his farm in Rensselær county, near Albany, and there bred them. Their descendants are now scattered through several good herds.



SHORT-HORN BULL.

In 1824 the late Col. John Hare Powell, of Philadelphia, Pa., commenced importations, and for several years continued them with much spirit and judgment. His selections were principally from the herds of Jonas Whitaker, of Otley, in Yorkshire, England. He bred them assiduously at his fine estate at Powelton, near the city, and sold many to neighboring breeders, and to go into Ohio and Kentucky, where many of their descendants still remain.

About the year 1828, Mr. Francis Rotch, then of New Bedford, Mass., selected from the herd of Mr. Whitaker, and sent to Mr. Benj. Rodman, of New Bedford, a bull and three heifers. They were afterwards sold to other breeders, and their descendants are now found in several excellent herds.

In the year 1833, the late Mr. Walter Dun, near Lexington, Ky., imported a bull and several valuable cows from choice herds in Yorkshire, England. He bred them with much care, and their descendants are now found in many good western herds.

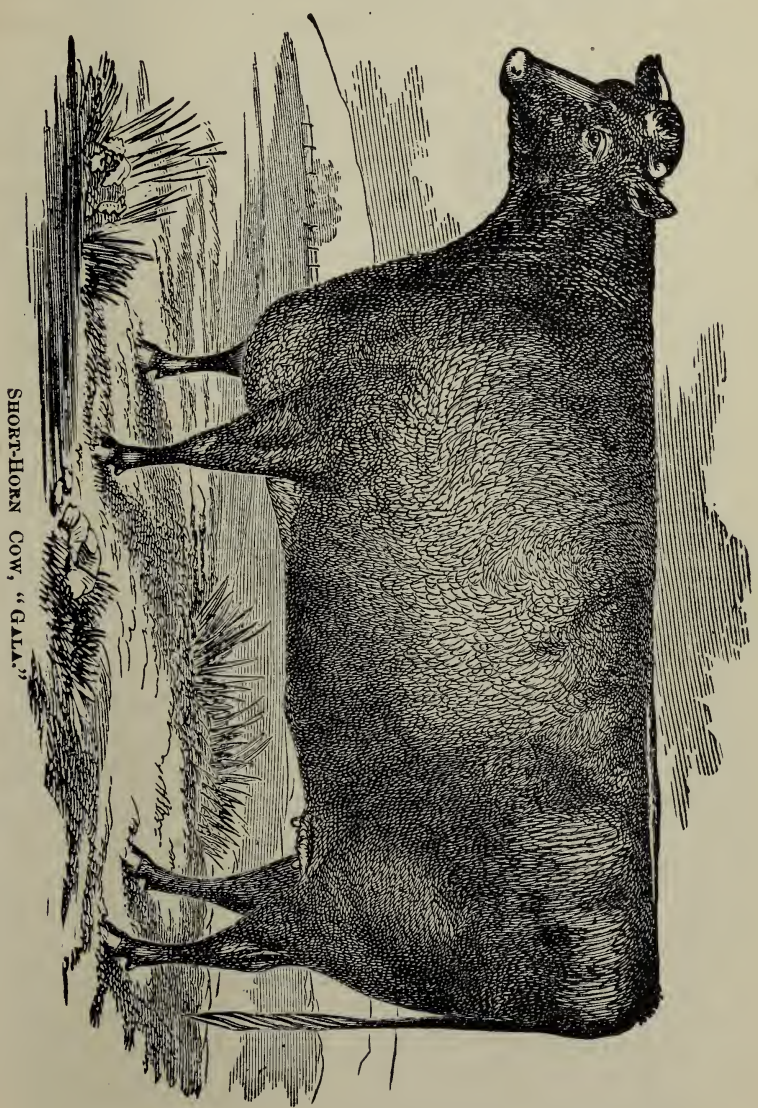
But the first enterprise in importing Short-Horns upon a grand scale was commenced in 1834, by an association of cattle breeders of the Scioto Valley, and its adjoining counties, in Ohio. They formed a company, with adequate capital, and sent out an agent, who purchased the best cattle to be found, without regard to price, and brought out nineteen animals in one ship, landed them at Philadelphia, and drove them to Ohio. Further importations were made by the same company, in the years 1835 and 1836. The cattle were kept and bred together in one locality, for upwards of two years, and then sold by auction. They brought large prices—$500 to $2,500 each—and were distributed chiefly among the stockholders, who were among the most extensive cattle breeders and graziers of the famous Scioto Valley.

In 1837-8-9, importations were made into Kentucky, by Messrs. James Shelby and Henry Clay, Jr., and some other parties, of several well-selected Short-Horns, some of which were kept and bred by the importers, and the others sold in their vicinity.

In 1837-8-9, Mr. Whitaker, above mentioned, sent out to Philadelphia, on his own account, upwards of a hundred Short-Horns, from his own and other herds, and put them on Col. Powell's farm, where he sold them at auction. They were purchased at good prices, mostly by breeders from Pennsylvania, Ohio, and Kentucky, and distributed widely through those States.

From 1835 up to 1843, several importations of fine stock were made by Mr. Weddle, an English emigrant, to Rochester, N. Y., and by American gentlemen, among whom were Messrs, E. P. Prentice, of Albany, N. Y., Mr. James Lenox and Mr. J. F. Sheaffe, of New York city,

Messrs. LeRoy and Newbould, of Livingston county, the late Peter A. Remsen, of Genesee county, N. Y., and Mr. Whitney, of New Haven, Ct., Mr. Gibbons, of New Jersey, and some others, not now recollected, —all valuable animals. They were bred for some years by their owners,



SHORT-HORN COW, "GALA."

with much care. Mr. Prentice, for several years, had a large and excellent herd on his home farm. After some years all these herds were sold and widely distributed. Their descendants still remain among our valuable herds.

In the year 1849-50, Col. J. M. Sherwood, of Auburn, and Mr. Ambrose Stephens, of Batavia, N. Y., imported from the herd of Mr. Bates a bull, and from Mr. Jno. Stephenson, of Durham, England, three bulls and several heifers, all choice animals, and successfully bred them during several years. The stock became widely distributed, and well known among stock dealers.

About the year 1839, Mr. George Vail, of Troy, N. Y., made an importation of a bull and heifer, purchased of Mr. Thomas Bates, of Kirkleavington, the first cattle from that particular herd which had been introduced into the State. A few years later, he purchased and imported several more cows from the herd of Mr. Bates, crosses of his "Duchess" and other families. He bred them with success and widely distributed their blood. Mr. Vail made a final sale of his herd in the year 1852.

A period of some years now occurred, in which few more, if any, Short-Horns were imported. Cattle, as well as all kinds of agricultural produce, were exceedingly low; but as things grew better, the demand for "blood" cattle revived, and the spirit for their breeding was renewed. Mr. Thomas Bates, a distinguished Short-Horn breeder in England, died in 1849. His herd, fully equal in quality to any in England, was sold in 1850. The choicest of them—of the "Duchess" and "Oxford" tribes—fell mostly into the hands of the late Lord Dacie, at Fortworth Park, already the owner of a noble herd, to which the Bates stock was added. He was a skillful breeder, and of most liberal spirit, and during the brief time he held them the reputation of the Bates stock, if possible, increased. Within three years from the time of the sale of Mr. Bates' herd, Lord Dacie died. In 1853, peremptory sale of his stock was widely advertised. Allured by the reputation of his herd, several American gentlemen went over to witness it. The attendance of English herders was very large, and the sales averaged higher prices in individual animals than had been reached since the famous sale of Charles Colling, in 1810. Mr. Samuel Thorne, of Duchess county, N. Y., bought several of the best and highest priced animals, of the "Duchess" and "Oxford" tribes, and added to them several more choice ones, from different herds. Messrs. L. G. Morris, and the late Noel J. Becar, of New York, bought others of the "Duchess", and "Oxfords," to which they added more from other choice herds. These were all brought over here, and bred. Mr. Ezra Cornell, of Ithaca, and Mr. James O. Sheldon, of Geneva, N. Y., soon afterwards made some importations, and obtained some of the "Bates" blood also. The late Gen. James S. Wadsworth, and other gentlemen of the Genesee Valley, N. Y., also made importations. These "Bates" importations have since been bred so successfully by their holders here, that several young bulls and heifers, bred by Mr. Thorne and Mr. Shel

don, have been purchased by English breeders, and sent over to them at good prices, where they are highly valued.

YEARLING SHORT-HORN BULL.

In 1852–3–4, several spirited companies were formed in Clinton, Madison, and other counties in Ohio, and in Bourbon, Fayette, and some

other counties of Kentucky, and made importations of the best cattle to be found in the English herds, and after their arrival here, distributed

SHORT-HORN COW, "DIANA."

among their s ockholders. Mr. R. A. Alexander, of Kentucky, also, during those years, made extensive importations of choice blood for his

own breeding, so that in the year 1856, it may be said that the United States possessed, according to their numbers, as valuable a selection of Short-Horns as could be found in England itself.

Keeping pace with the States, a number of enterprising Canadians, since the year 1835, among whom may be named the late Mr. Adam Fergusson, Mr. Howitt, Mr. Wade, the Millers, near Toronto, Mr. Frederick Wm. Stone, of Guelph, and Mr. David Christie, of Brantford, in Canada West, and Mr. M. H. Cochrane and others, in Lower Canada, have made sundry importations of excellent cattle, and bred them with skill and spirit. Many cattle from these importations, and their descendants, have been interchanged between the United States and Canada, and all may now be classed, without distinction, as American Short-Horns.

Short-Horns in the West.

In the Northwestern States the first importation of Short-Horns direct from England was by the Illinois Importing Company, in 1858. This was an association of gentlemen, a part of them members of the State Board of Agriculture, in connection with prominent breeders of the State. They returned in July of the same year with twenty Short-Horn cows and seven bulls, of approved blood, which were sold at auction on August 27th, at Springfield, to breeders throughout the State. They also brought over two stallions, three Cotswold rams, nine ewes, four Southdown rams, eight Southdown ewes, five Berkshire boars, four Berkshire sows, and ten boars and sows of Irish breeds; also Cumberland and Yorkshire boars and sows. From this time on, various States in the West have taken up the breeding of Short-Horns as they have increased in wealth and population, until now no finer herds can be found in any other locality; and, the fact that at the New York Mills sales individual animals brought prices all the way to over $30,000, for exportation to England — prices which before this time would have been considered fabulous — shows conclusively that Short-Horns, as bred in the United States, have not suffered in comparison with those bred in their native land. No such prices were ever reached before in any country in the world; nor have they been since. To-day they are found wherever civilization extends. As beef producers they have no superiors; as milk producers there are families eminent in this respect, and they have left their impress upon the stock of the country wherever introduced.

Short-Horns for the Dairy.

It has been held that the Short-Horns are as good for milking as they are for beef. That they once were most excellent dairy cows there is no

doubt. That American Short-Horns of the present are not, as a class, even decent milkers, there is as little doubt. The early importations of Short-Horns were of the milking strains. For the last thirty years, however, they have been bred with such special reference to beef points and early maturity that it is now difficult to find a decent milker in any of the more fashionable strains of blood, and very many of the cows will not give milk enough to properly raise a calf. Once in a while, however, a very superior milking animal appears, showing, by reversion, what the capabilities of the breed might be in this direction.

That the early importations of Short-Horns were uniformly good in this direction, as well as admirable beef cattle there is no doubt. That they have left their impress upon the native cattle in this direction is unquestioned. That they exist to some extent in England and America, in particular herds, is certain. We have seen them here and know they are there. They have grown less, year by year, as the improvement of other dairy breeds became more and more manifest, until of late years little has been claimed for them as milkers. Their great value as early maturity beef makers,—attaining great weight—having superceded their purely milking characteristics. Among the better milkers may be named the descendants of the "Patton breed," the "seventeens," or the importation of 1817, and some descendants of the Ohio importation of 1834. In fact, this latter importation was made solely with a view to beef and flesh points, and since this time milk has been ignored by the more fashionable breeders both in England and America.

Short-Horns for Beef.

Throughout the whole West, especially, beef was the object sought. The land was cheap, fertile, and the pastures flush. Until within the last few years, butter and cheese was not an exportable product, beef was. It is not strange that a class of animals was sought that would produce the most beef in the least possible time. How this has been developed, the great herds of Ohio, Kentucky, Tennessee, Indiana, Michigan, Wisconsin, Illinois, Missouri, Iowa, and later, Minnesota, Nebraska, and Kansas, give ample proof.

In breeding there are no superior cattle in the world. Their usefulness as beef producers will continue to grow with the settlement of the country. The value of the bulls for crossing upon the ordinary stock of the country is becoming more and more appreciated every year. It will continue to be an increasing integer for many years to come.

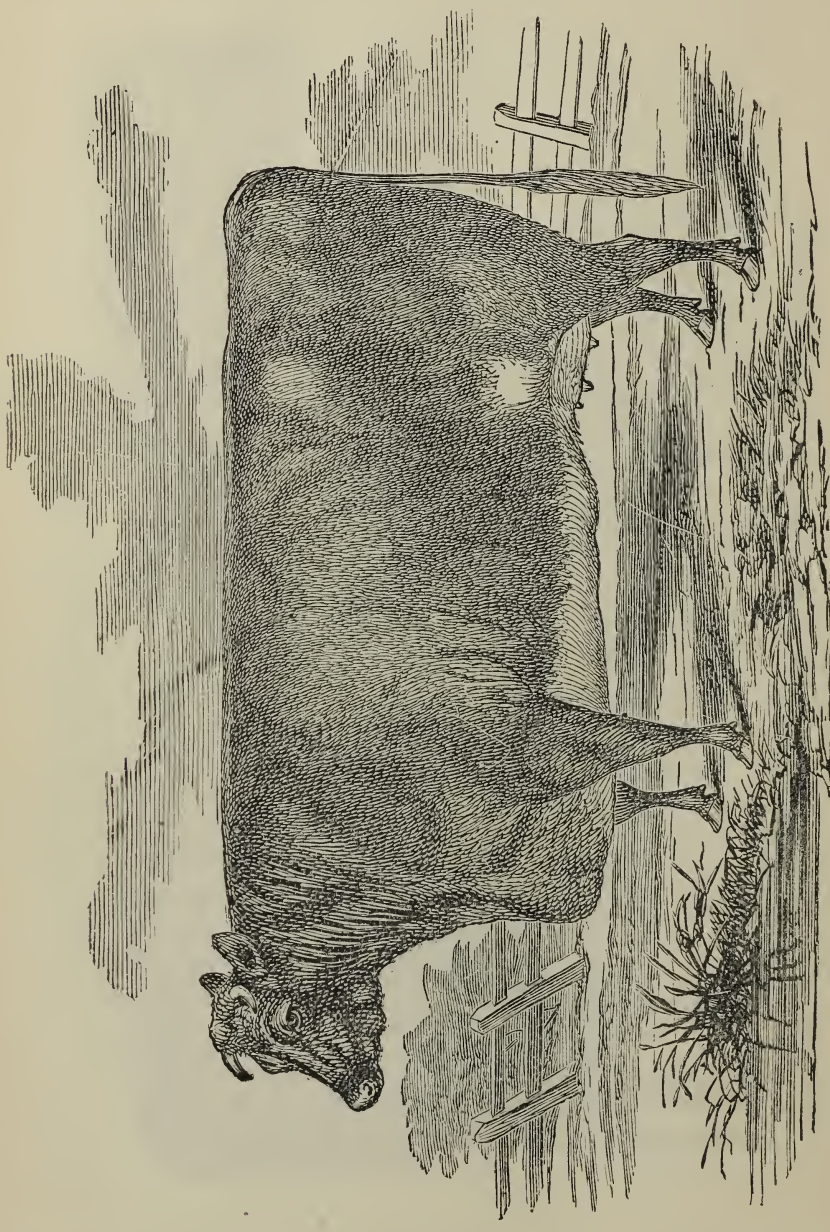
On the next page, as showing a modern bred Short-Horn bull, combining excellent beef points, with great stamina and constitution, we give an illustration of "Hiawatha."

The modern Short-Horn has great thickness of carcass, squarish-rotund shape, rapid growth, early maturity, and a ripeness at two, three, four, or five years, that is attained by no other breed. Many are also the hand-

SHORT-HORN BULL, "HIAWATHA."

somest cattle to look at of any known breed—weight, substance and style being taken into consideration. There is a wonderful fullness in the carcass, extending to every part. The choice flesh is put on in parts

where ordinary cattle fail; the offal is exceptionally light, as light as it would be among common native cattle of two-thirds the weight. In the milk-yielding Short-Horns there is a tendency to leanness. Many are



SHORT-HORN COW, "ROSAMOND."

lighter before, flatter in the side, but yet exceedingly firm all over, from a dairyman's standpoint. In the beef animals there is a rotund fullness, a smoothness, a majesty, no where else seen.

As showing beef in the Short-Horn cow, in an eminent degree, we give a portrait of the cow "Rosamond," showing not only good beef points but milking qualities as well.

Points of Short-Horns Described.

The points of Short-Horns—and which will apply in judging all beef animals, with slight variations, to be hereafter described—are worthy of a somewhat minute description. The points are of two classes—those observed with the eye and those felt by the touch. By the eye one observes the general contour of the animal; size, length, breadth, thickness, fineness of body, head and limb; the loin, back, thigh, the spring of the rib and the manner in which the animal is ribbed up close to the hip bones. The touch—that is, the feeling under the touch—shows length and quality of the hair, thickness and elasticity of the skin. The eye and expression of countenance is indicative of disposition and temper. An elastic, mellow and yet firm hide, of medium thickness, is an indication of well marbled flesh, while a floating, soft skin will indicate blubbery fat, and often dark colored flesh.

The Butcher's Profit.

The butcher in buying an animal for beef has now-a-days but a single object in view—the animal that will turn out the greatest amount of lean meat in the prime parts, with the least offal, and only a moderate amount of fat for fat is now one of the cheapest portions of the animal. Years ago, in the days of tallow candles, the reverse was the case. The back, loin, and ribs are the choice bits; next the rump and thigh; then the shoulders; while the neck and head are comparatively worthless. The sagacious breeder, while keeping this constantly in view, seeks to add early maturity to good flesh. He who comes nearest to this has the best animal, whatever the breed, or the pedigree of the particular breed. The butcher's block is the final, the crucial test.

A description of the points of the Short-Horn was so carefully and admirably given by Dr. A. C. Stevenson, President of the Indiana Short-Horn Breeders' Association, at the first convention thereof, that we append a synopsis, accompanied with an outline of a Short-Horn, to which reference can be made, illustrating the principal points.

In this it will be seen that a, b, c, d, f, h, m, j, k, x, y, z, represent the inferior parts; from the girth p, back, including r, s, t, u, v, the superior parts. From this it will be easy to understand the points and the respective numbers as given in the scale.

The Head.

"The head should be small." This is a very imperfect description of

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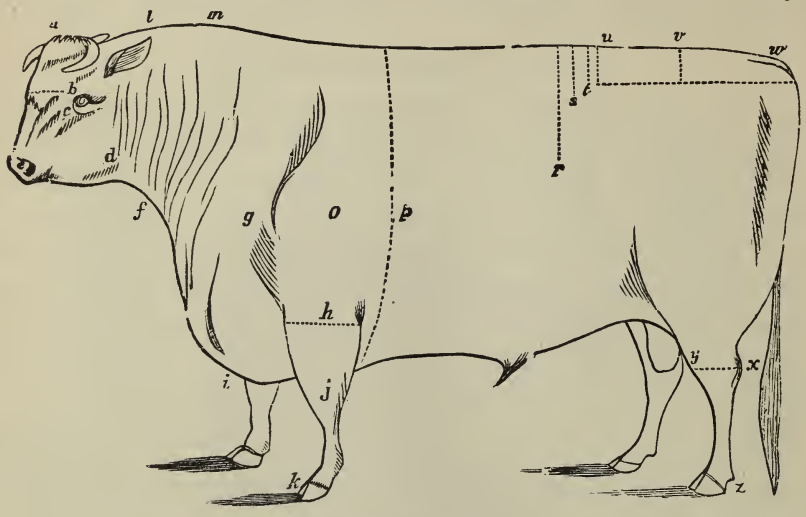
the head, but in too many accounts, all that is given. If the size of the head were all that was of consequence, a pound difference in any case



Points of Short-Horn Bull.

would be of little consequence in the sale of a bullock. It is the *form* of the head that becomes of so much interest to the breeder. The head above the eyes should be wide, giving space for large cerebral development. The intelligence of the animal depends upon a well-developed brain and nervous system; upon which, also, so much depend the vigorous and healthy action of the organs of digestion and assimilation; the circulation and the vital functions generally; the intelligence and temper of a cow depends much upon a well-developed brain. It will be found by observation that most vicious beasts have small upper heads, and are large below the eyes. Again, the upper head should be wide, to give width to the articulations of the lower jaw. It is necessary that the part of the mouth where the food is to be masticated should be large, that the supplies required for the stomach may be well masticated and re-masticated in chewing the cud. There is another reason for width at the base of the head and between the angles of the lower jaw: it is here that the very important passages have their entrance, which supply food for the stomach and air for the lungs. Close at hand, also, is the important connection of the spinal marrow and the brain, to say nothing of many large and important blood-vessels that find their way to the head. These considerations we think conclusive as to the necessity of size of head.

The portion below the eyes, the face, should be comparatively small. Its principal office is to gather food and air. Thin lips and elastic nostrils are wanted. The eyes should be large, bright and lively, and yet quiet. The physiognomy of the ox is as clearly indicative of his character

as that of a man is written upon his face; and the reason that less is indicated in the face of an ox is because he has fewer vices, and has been guilty of fewer transgressions. A small dark eye, set in a dark circle, with a large face below and a narrow head above, will indicate an animal that is bad tempered, wild, and consequently a poor feeder. The circle around the eye should be of a bright yellow color, the nose the same. These considerations may seem trifles, yet this color is the result of a peculiar secretion, and the inference is a probable one, at least, that other secretions will be apt to resemble it in color. Hence, the secretion of milk will be apt to resemble it in color, and a bright colored flesh is betokened by these peculiar secretions as indicated in the color of the nose and circles about the eyes. As a very large ear mostly indicates sluggishness, one of medium size is preferable. A bullock of fine organization will manifest very clearly his impressions by the movement of his ears. If he flees from danger his ears are erect, or a little inclined backward, that he may be the better warned of danger behind. If he is in haste to meet a kind master, who is bringing him a desired meal, the ear is presented forward. The horns should be clear, without black tips or any black marks whatever—some say of a waxy color, some again, claim that they should be flat in Short-Horns. But these matters are, most of them, non-essentials. We dismiss the head, after attaching it to the neck in its proper position—not at right angles, but at an angle of so many degrees that, with the under part of the neck it forms an arch. This gives a better throat and a freer passage for the food and air to the stomach and lungs, and is graceful withal.

The Neck.

The neck expresses very much less to the breeder than the head and face. The neck should be just long enough to enable the taking of food easily from the ground. It should be strong and well muscled upon its sides, covering at its base the points of the shoulders well, and at its junction with the head it should be small and round, with its skin fitting it pretty much as a well-fitting stocking does the leg—the under line of the neck with the under line of the jaw. A thin, broad neck is sure to indicate weakness and poor feeding and fattening qualities. Animals having such may well be avoided as breeders.

Contour of the Body.

The butcher, the breeder and the stock dealer, may now meet and consult profitably on the general contour of the body. Here the opinions of the former may be adopted, as he fixes the price of all 'butchers' stuff.' The ox of given weight that will sell for most in mar-

ket possesses the points that must be adopted. These points are now, however, well established, and we have only to refer to them and notice the reasons on which they are founded. We proceed to name them before we give their *rationale*. In general contour the body should be nearly a square. The crops should be wide. The line of the back should be straight; the line of the belly nearly so, swelling a little behind the ribs; the flank low; the ribs barrel-shaped; the loins wide, and the rump long and wide; the back should be wide, and the thigh should be long and wide; the legs short and comparatively small, or at least not coarse; tail light; hair soft and fine. The color should be red or white, or a mixture of the two, as roan or pied.

As has already been said, the body should be nearly a square. The vital currents moving in short lines are more effective than when moving in those of great length. The blood moving from the heart along very extended channels, flows with much less force as it recedes from the cause that set it in motion. The same is probably true of the nervous currents. The great vitalizing organs are located near the center of the system—a provision of nature by which the vital currents are shorter than under any other arrangement. Here is the heart sending out its great currents of arterialized blood in all directions, to supply and nourish all the members of the body. Sitting over it is that wonderful air machine, the lungs, receiving the entire venous currents—an atmospheric bath—by which they are so renovated and changed as to make the blood again fit for the heart's use, to which it is returned by the shortest possible route. These organs lie encased together, and never cease their operations night or day. But just here in this great center is another great vitalizer of fully equal importance—the stomach. Here the food is received and changed into chyle, which is at once thrown into the circulation, where its office of supplying the system is performed. Now, the nearer a body is compacted around these great vitalizing systems the more effectual will be the supplies. Observation fully sustains these views. A very lengthy bullock never fattens so readily as a short one. The breeds of hogs with long bodies are known not to fatten so readily as those of short, square forms, as the Siamese and Chinese. The same is true of sheep, and also of the horse. And even in man, we rarely find a corpulent man who will measure six feet. Obesity will generally be found under six feet. Health and vigor is equally confirmed by observation, as a result of the square structure. Longevity may also be claimed with the greatest propriety for the same proportions. A bullock with a square frame will be sure to possess all the qualities of health and vigor, and will feed and fatten as well or better than a long one.

Broad in the Crops.

The animal broad in the crops has a better back; but it is also evidence of a better rib beneath the shoulder-blade, giving greater width to the chest within, and consequently greater play to the lungs. This position of the shoulder-blade enables the legs to be brought more gracefully under the chest beneath. There are some beasts whose fore-legs stand so wide apart that they very much resemble two sticks stuck into a large pumpkin. Such animals are considered awkward and inconvenient at least.

The Back Should be Straight and Broad.

A broad back affords valuable roasting bits, and will be the delight of the butcher. The straight back affords a better spinal column, and gives the proper space to the cavities beneath, which, as we have just seen, are occupied by the most important organs. A straight line also gives to the ribs a more graceful as well as more convenient attachment.

Ribs Should be Barrel-Shaped.

The ribs rising well from the spine, giving to the body a round or barreled shape, gives much more room to the organs within—the heart and lungs—than there would be if the ribs descended in such a manner as to give a flat side. A beast with flat sides, and consequently a narrow throat, will lack greatly in vigor and health, and all the essential qualities that constitute a good bullock. A bad rib gives poor space to the abdominal organs which lie immediately behind those of the chest, unless the belly is greatly sagged, which is generally the case.

The Loin Should be Wide.

This is an interesting point to those who love choice bits and are willing to pay well for them. The butcher makes large estimates here, and is sure to suit liberal purchasers. But nature is ever true to herself, for here, as elsewhere, beneath a broad loin she has provided large space for important organs, as the bowels, kidneys, and the organs of the pelvis. The rump of a good Short-Horn is a very nice point. The back should extend out straight to the setting on of the tail. The thigh should pass up to this point nearly straight, so as to make the junction a right angle. This point, in many beasts, will be found to be a circle, which is unsightly and causes a loss of prime beef.

The Legs.

The legs should be short. There are precisely the same reasons for

objecting to long legs that there are to long necks or long bodies. Observation proves a *leggy* animal to be not so good a feeder as one with short limbs. The bone of the leg should be fine and smooth, and not too large. The legs should stand well under the animal, and the hocks directly in line with the body, so that in moving, the hocks will be well separated, or about as far apart as the hind feet. The fore-legs should be straight and stand well under the chest, that the animal may have an easy and free movement. The inner side of the fore-legs, as it passes the sternum, presents a beveled appearance, to bring the limbs to their proper position beneath. Upon the proper position of the limbs depends that ease and gracefulness with which a bullock should move. It may be thought of no consequence how a bullock moved so that he is able to get to the market, but be assured there is much in it, it evinces strength and health, which are indispensable in feeding. I have seen Short-Horns carrying two thousand pounds and upwards, with limbs so perfect that their movements were as nimble as if they were carrying but a thousand.

The Touch.

By this the butchers ascertain beforehand the quality of the flesh. By it the breeder ascertains the aptitude to fatten as well as the quality and quantity of flesh that the animal will carry.

Of all the qualities of the ox, this is probably the most difficult to understand. It is the peculiar sensation of softness and elasticity that is produced by the pressure of the hand on different parts of the body. This sensation depends, in part, upon a large cellular development beneath the skin and between the muscles, and part upon the muscular structure, adapting itself to the laborious duties it has to perform. It is, therefore, to the cellular and muscular tissue that this sensation of touch is to be attributed. It is very common to find a softening of the muscular fibre as an accompaniment or a precursor of disease that may mislead. The same may be observed in the aged of both man and beast. What is 'touch,' or what is it to 'handle well?' How is it to be distinguished from that which portends bad health and old age? By its elasticity—its power to replace the parts when pressed—a springy sensation. Mellowness from disease has a sluggish feel and moves slowly when under the hand; to a less extent, it is true, still something of the same that is manifested in the pressure of the fingers on a dropsical limb as compared with a healthy one. In the one the indentions replace themselves sluggishly, whilst in the other with a ready elasticity.

It will require much practice to become an adept in this knowledge. Still many useful lessons may be daily had by the examination and handling of one's own stock. Comparative handling will afford much

assistance. Take those animals that are known to accumulate fat readily and largely, as the opossum or the bear, or any other known to take on fat readily, and you will find a peculiarly soft and mellow 'touch.' Those breeds of swine, as the Chinese or Siamese, that are known to accumulate fat largely, as compared with some of the poorer wood breeds, will offer good and ready illustrations. But probably the most ready illustration will be found in man himself. All that class of persons disposed to corpulency will be found to have a soft mellow touch, while those disposed to leanness will be found rigid and hard. This may be readily recognized in shaking hands. A very delicate lady may sometimes be found to have a hard hand as well as a sharp tongue. Smooth, soft skin will also be found belonging to this class of persons.

The Skin.

The skin should be thick, soft and elastic—fitting alike either a poor or fat ox. A lean animal, with an inelastic skin stretched upon him, could not fatten for the want of space to expand in. But with an elastic skin he may be swelled to great dimensions in what seemed to be but a covering for his bones. The skin performs very important functions in the animal economy. It is not only a covering for all the parts beneath it—a protector against cold and heat, and all external causes of danger, but it is the seat of a vast system of minute blood vessels and capillaries, of exhalents and absorbents. A vast nervous tissue centers here that renders the skin sensitive in the highest degree. The great vital worth and importance of the skin may be readily appreciated by any injuries done it. The rapidity with which extensive burns destroy life, may serve as a sufficient illustration. 'Destroy my skin, and you shall have my bones also.'

The Hair.

The hair should be thick and fine, forming a protection against inclemencies of weather. It is not sensitive, and is, therefore, a proper shield to the whole body, and it is an evidence of the wisdom displayed in the creation of this family of the animal kingdom, that its hair—its outer garment, against which all injuries must first come—should be without sensation—a complete coat of mail, injuries to which cause no pain. Fine hair is also an evidence of a finely organized skin, a skin exquisitely finished in its whole structure of minute vessels and tissues. A skin thus delicately organized is also evidence that other organs are alike constructed. Nature, in all her parts, undoubtedly produces a correspondence, so that if one part is of a peculiar structure, either fine or coarse, other parts are apt to correspond. Parts seen may be considered indica-

tive of parts not seen. It may be permitted to add that in all the scrub cattle that I have grazed and fed, I have never found one with fine silky hair that did not fatten well and make a desirable bullock.

Color.

Short-Horns are red or white, or these colors blended as roan or pied. Fashion, for the time, may make one or the other of these colors popular. This is probably so now with the red color. It may be so of another color in a few years. A caprice that excludes all but the red color is injurious. It limits improvement and confines it to a limited portion of the breed. It encourages the use of inferior animals just to obtain a fashionable color, and rejects better ones because they are of different color. There is, in consequence, great danger of deterioration of this noble breed of cattle as a result of such puerile practices. If the breed is to be kept up to its past high standard the very best selections should be bred regardless of color, provided it is the one peculiar to the breed. We would admonish breeders and lovers of this noble race of cattle to give no encouragement to such departures; they are evil, and that continually.

Perfection.

Both ignorant and cultivated alike; the ordinary breeder and the scientific one; the practical man and the visionary one; each will establish in his own mind an ideal of what any object should be. When this ideal is required to stand the test of practical experience, to be defined by a scale of points, not one in ten, even among those who think themselves competent to establish a standard of excellence can do so, point by point. The reason is he has never read, nor has he educated himself in any other way to that exactitude of judgment required in matters of such nicety; in other words we have not the scientific idea of what is necessary in the premises; no absolute rule to go by, and so the whole amounts, after all, to something very like mere guessing. For dairy purposes the udder of the cow is the strong point. In animals bred for their flesh, the meat is the essential thing and also that it be laid on in the prime parts.

To enable any person to judge more or less correctly according to the study he gives, and the manner in which he has educated his eye and touch, we append the scale of points for judging Short-Horns, as found in the American Herd-Book.

In studying this scale it will do quite well for all beef breeders—always bearing in mind the difference in make up of the breed. Thus the Short-Horns will be found full in the rump behind, the Devons and Herefords more pointed, and essentially different in other respects; yet these very

differences constitute their value: their beef is certainly better than that of the Short-Horn; but still they fail in other particulars. There is no such thing as absolute perfection in any thing finite. We simply come as near it as possible. The Short-Horns, in all their attributes, certainly have but little more to be desired as beef makers, and some families, alas too few, are deep and excellent milkers.

Scale of Points for Short-Horn Bulls.

	Points.
Art. 1.—Purity of breed on male and female side; sire and dam reputed for docility of disposition, early maturity and aptitude to fatten; sire a good stock-getter, dam a good breeder; and giving a large quantity of milk, or such as is superior for making butter or cheese. - - - - - - - -	7
Art. 2.—Head muscular and fine; the horns fine and gradually diminishing to a point, of a flat rather than a round shape at the base, short and inclined to turn up, those of a clear, waxy color to be preferred, but such as are of a transparent white, and tinged with yellow, admissible; ears small, thin and covered with soft hair, playing quick, moving freely; forehead short, broad, especially between the eyes, and slightly dished; eyes bright, placid, and rather prominent than otherwise, with a yellow rim around them; lower part of the face clean, dished and well developing the course of the veins; muzzle small, nose of a clear orange or light chocolate color; nostrils wide and open; lower jaw thin; teeth clean and sound. - - -	5
Art. 3.—Neck fine and slightly arched, strongly and well set on the head and shoulders, harmoniously widening, deepening and rounding as it approaches the latter point; no dewlap. - -	2
Art. 4.—Chest broad, deep and projecting, the brisket on a lower line than the belly. - - - - - - - - -	5
Art. 5.—Shoulders broad, strong, fine and well placed; fore-legs short, straight, and standing rather wide apart than narrow; fore-arm muscular, broad and powerful, slightly swelling and full above the knee; the bone fine and flat; knees well knit and strong; foot flat, and in shape an oblong semi-circle; horn of the hoof sound and of a clear waxy color. - - - - -	2
Art. 6.—Barrel round and deep, and well ribbed up the hips. -	4
Art. 7.—Back short, straight and broad from the withers to the setting on of the tail; crops round and full; loins broad; huckle bones on a level with the back; tail well set, on a level with the back, fine and gradually diminishing to a point, and hanging without the brush an inch or so below the hock, at right angles with the back. - - - - - - - - -	4

ART. 8.—Hind quarters from the huckle to the point of the rump well filled up; twist well let down and full; hind legs short, straight, and well spread apart, gradually swelling and rounding above the hock; the bone fine and flat below; legs not to cross each other in walking, nor to straddle behind. - - - 3

ART. 9.—Skin of medium thickness, movable and mellow; a white color is admissible, but rich cream or orange much preferable; hair well covering the hide, soft and fine, and if undercoated with soft, thick fur in winter, so much the better; color, pure white, red roan, bright red, or reddish yellow and white. (A black or dark brown nose or a rim around the eye, black or dark spots on the skin and hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - - 3

ART. 10.—Good handling. - - - - - - - - 4

ART. 11.—Sure stock-getter. - - - - - - - - 4

ART. 12.—Stock, when made steer, certain to feed kindly for beefers at any age, and make prime beef. - - - - - 5

ART. 13.—General appearance. - - - - - - 2

Perfection. - - - - - - - - - - 50

Scale of Points for Short-Horn Cows.

POINTS.

ART. 1.—Purity of breed on male and female side; sire and dam reputed for docility of disposition, early maturity and aptitude to fatten. Sire a good stock—getter. Dam a good breeder; giving a large quantity of milk, or such superior for making butter or cheese. - - - - - - - - - 7

ART. 2.—Head small and tapering; long and narrower in proportion than that of the bull. Horns fine and gradually diminishing to a point; of a flat rather than of a round shape at the base; short, and inclined to turn up; those of a clear waxy color to be preferred; but such as are of a transparent white, slightly tinged with yellow, admissible. Ears small, thin, and well covered with soft hair; playing quick, moving freeely. Forehead of good breadth between the eyes, and slightly dished. Eyes bright, placid, and rather prominent than otherwise, with a yellow rim round them. The lower part of the face clean, dished, and well developing the course of the veins. Muzzle small; nose of a clear bronze, or light chocolate color—the former much preferred. Nostrils wide and well opened. Lower jaw thin. Teeth clear and sound. - - - - - 3

ART. 3.—Neck fine and thin, straight, and well set on to the head and shoulders, harmoniously widening, deepening, and slightly rounding in a delicate feminine manner as it approaches the latter point. No dewlap. - - - - - - - - - 2

ART. 4.—Shoulders fine and well placed. Fore-legs short, straight and well spread apart. Fore-arm wide, muscular, slightly swelling, and full above the knee; the bone fine and flat below. Knees well knit and strong. Foot flat and in the shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. - - - - - - - - - - - 2

ART. 5.—Chest broad, deep and projecting—the brisket on a lower line than the belly. - - - - - - - - - 5

ART. 6.—Barrel round, deep and well ribbed up to the hips. - 5

ART. 7.—Back short, strong, straight from the withers to the setting of the tail. Crop round and full. Loin broad. Huckle bones on a level with the back. Tail well set, on a level with the back or very slightly below it; fine and gradually diminishing to a point; and hanging, without the brush, an inch or so below the hock, at right angles with the back. - - - 4

ART. 8.—Hind quarters from the huckles to the point of the rump long and well filled up. Twist well let down and full. Hind legs short, straight and well spread apart; gradually swelling and rounding above the hock; the bone fine and flat below. Foot flat, and in shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. Legs not to cross each other in walking, nor to straddle behind. - - - - 3

ART. 9.—Udder broad, full, extending well forward along the belly, and well up behind Teats of a good size for the hand; squarely placed with a slight oblique pointing out; wide apart; when pressed by the hand the milk flowing from them freely. Extra teats indicative of good milking qualities, but should never be milked, as they draw the bag out of shape. Milk veins large and swelling. - - - - - - - - - - 4

ART. 10.—Skin of a medium thickness: movable and mellow; a white color is admissible, but a rich cream or orange much preferable. Hair well covering the hide; soft and fine, and if undercoated with soft, thick fur in the Winter, so much the better. Color pure white, red, roan, bright red, red and white, spotted roan, or reddish and yellow and white. (A black or dark brown nose, or rim around the eye, black or dark brown spots on the skin and the hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - - - 3

ART. 11.—Good handler. - - - - - - - - -	4
ART. 12.—Sure and good breeder. - - - - - - -	4
ART. 13.—General appearance. - - - - - - - -	2
Perfection. - - - - - - - -	50

JERSEY BULL, "COMET."

V. The Alderneys.

In the British Channel, between Great Britain and France, are a number of islands noted for their salubrity of climate and fertility of soil. Many years ago these islands, particularly Jersey, were noted for their

superior fruit, and large quantities of cider and perry were annually made there.

Of late years these islands, Alderney, Jersey, and Guernsey, have become celebrated throughout England and America, for their breed of cattle; the cows of which give milk of unsurpassed richness.

These cattle are undoubtedly of French origin. The Normandy cattle are larger than the Jerseys, and Youatt says, have a greater tendency to fatten. He passes them by, in his admirable work on cattle, with scarcely more than a mention; this is to be regretted, since he was so careful and conscientious a historian. He says:

"They are found mainly in gentlemen's parks and pleasure grounds, and they maintain their occupancy there, partly on account of the richness of their milk, and the great quantity of butter which it yields, but more from the diminutive size of the animals. Their real ugliness is passed over on these accounts; and it is thought fashionable that the view from the breakfast or drawing room of the house should present an Alderney cow or two grazing at a little distance.

"They are light red, yellow, fawn or dun colored; short, wild-horned, deer-necked, thin, and small-boned; irregularly and often very awkwardly shaped."

A Prejudiced Statement.

Quoting from Mr. Parkinson, who, Mr. Youatt says, seems to have had a determined prejudice against them, he writes:

"Their size is small, and they are of as bad a form as can possibly be described; the bellies of many of them being four-fifths of their weight. The neck is very thin and hollow; the shoulder stands up, and is the highest part; they are hollow and narrow behind the shoulders; the chine is nearly without flesh; the hucks are narrow and sharp at the ends; the rump is short, and they are narrow and light in the brisket." Mr. Youatt adds for himself:

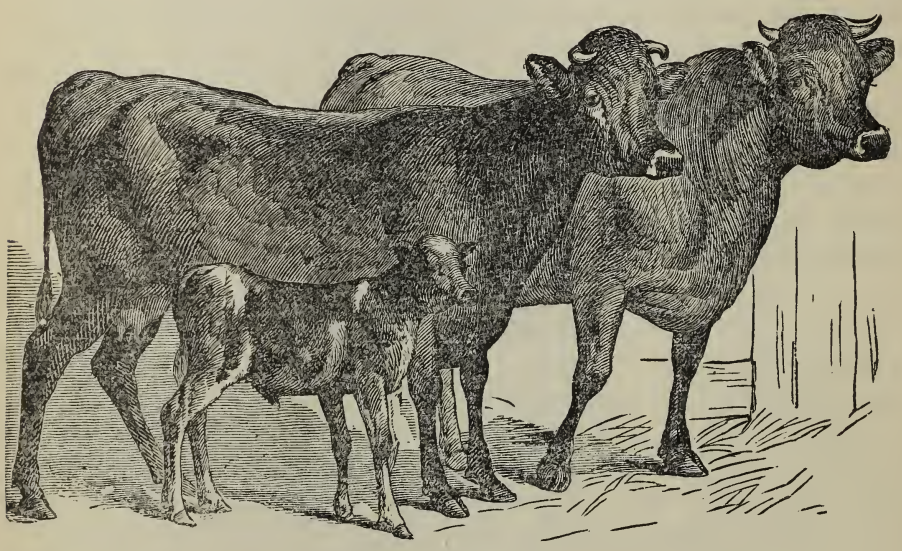
"This is about as bad a form as can possibly be described, and the picture is very little exaggerated, when the animal is analyzed, point by point; yet all these defects are so put together, as to make a not unpleasing whole."

Mr. Youatt, however, compliments them with giving exceedingly rich milk, and with fattening in a surprising manner when dry.

We have quoted the above for two reasons: one as showing probably what may have been nearer the truth than we might naturally expect from seeing the best specimens now, and the other as showing that this breed has made a great advancement since his day, both in quantity of milk given, and in symmetry and perfection of form.

From an American Standpoint.

Mr. Lewis F. Allen, the best known historian of American cattle, says: "Beginning with the head — the most characteristic feature — the muzzle is fine, the nose either dark brown or black, and occasionally a yellowish shade, with a peculiar mealy, light-colored hair running up the face into a smoky hue, when it gradually takes the color of the body; the face is slightly dishing, clean of flesh, mild and gentle in expression, the eye clear and full, and encircled with a distinct ring of the color of the nose; the forehead is bold, horns short, curving inward, and waxy in color, with black tips; the ear is sizable, thin, and quick in movement. The whole head is original, and blood-like in appearance, more so than in



A Trio of Jerseys.

almost any other of the cattle race—reminding one strongly of the head of our American Elk. The neck is somewhat depressed — would be called 'ewe-necked,' by some — but clean in the throat with moderate, or little dewlap; the shoulders are wide and somewhat ragged, with prominent points, running down to a delicate arm and slender legs beneath; the fore-quarters stand rather close together, with a thinnish, yet well developed brisket between; the ribs are flat, yet giving sufficient play for good lungs; the back depressed, and somewhat hollow, the belly deep and large, the hips tolerably wide, the rump and tail high, the loin and quarter medium in length, the thigh thin and deep, the twist wide, to accommodate a good sized udder, the flanks medium, the hocks or gambrel joints crooked, the hind legs small, the udder capacious, square,

set well forward, and covered with soft, silky hair; the teats fine, standing well apart, and nicely tapering; the milk veins prominent."

Characteristic Colors.

The colors are mostly light red or fawn, and black, mixed and plashed with white; the solid colors are, we think, generally favored, and, to our mind, the best cattle, as showing careful breeding, though we have seen the most superior cattle among all these colors. So we have seen some distinctly roan, with round, quite smooth forms, called pure; they should always be avoided, as there is more than a suspicion that such have Short-Horn blood in them, which can do this breed no good, but on the contrary, harm.

The breed is distinctly a milk breed, and is of no value whatever except as yielding fair messes of exceedingly rich milk—giving largely of the most superior cream, producing hard, and most delicately flavored butter. Thus any cross on this ancient and carefully bred stock must necessarily injure them in the points where they excel other cows. These are: Superiority of the milk, cream and butter, golden in color, delicate in texture and flavor, and commanding prices in the market, from wealthy citizens, that no other make can reach.

They are Milking Cows.

Whichever of the three varieties may be chosen, they should be bred for this and nothing else. Whether they be from Alderney, Jersey, or Guernsey, no infusion of other blood can improve them, neither can they improve any other breed. The bulls may improve our native cows, if the cows be good milkers, the hereditary milking qualities of the race being pre-potent in the progeny. For this improvement, however, none but pure blood bulls should be used, and this rule will hold good in all breeding.

The pure animal is pre-potent, the grade is not, and pure bred animals of all the superior races are now so plenty that it will not pay to use grade bulls for the improvement of stock.

The Value of Purity.

To show the value of purity, we will perhaps, find no more appropriate place than this.

A thorough-bred animal upon native stock produces in the first succeeding generation an animal partaking equally of the blood of the sire and dam, or what is called a half-blood. The next generation, or the produce of a full-blood and a half-blood will give a three-quarters-bred animal.

The young of a pure-bred and three-quarters-bred will give a seven-eighths-bred. Following in the same line the next generation will give an animal possessing fifteen-sixteenths of pure blood.

In reality it will be far more than we have stated, for the pre-potent element of pure blood, constantly present, will continually be an increasing integer in the progeny. Hence animals from seven-eighths to fifteen-sixteenths-bred, cannot be distinguished from one purely bred, except by a most critical, and at the same time expert judge. For all practical purposes they are fully equal to an animal purely bred, that is to say, as dairy cows, but here the comparison must end. A taint of impure blood once in, cannot be bred out for many generations—never in fact. There is always danger of reversion. One may, theoretically at least, breed grades up for a thousand years, and yet not have purely bred animals. Hence the extraordinary prices paid for stock, the pedigrees of which have been kept absolutely without taint of admixture.

The Value of Points.

So important is the question of symmetry of form, and points of excellence, in stock, viewed as integers in the make-up of an animal—real value being adaptation to the necessities required—that, of late years, all animals are judged thereby. As a study of these we give a figured portrait of a model cow, illustrating perfection.

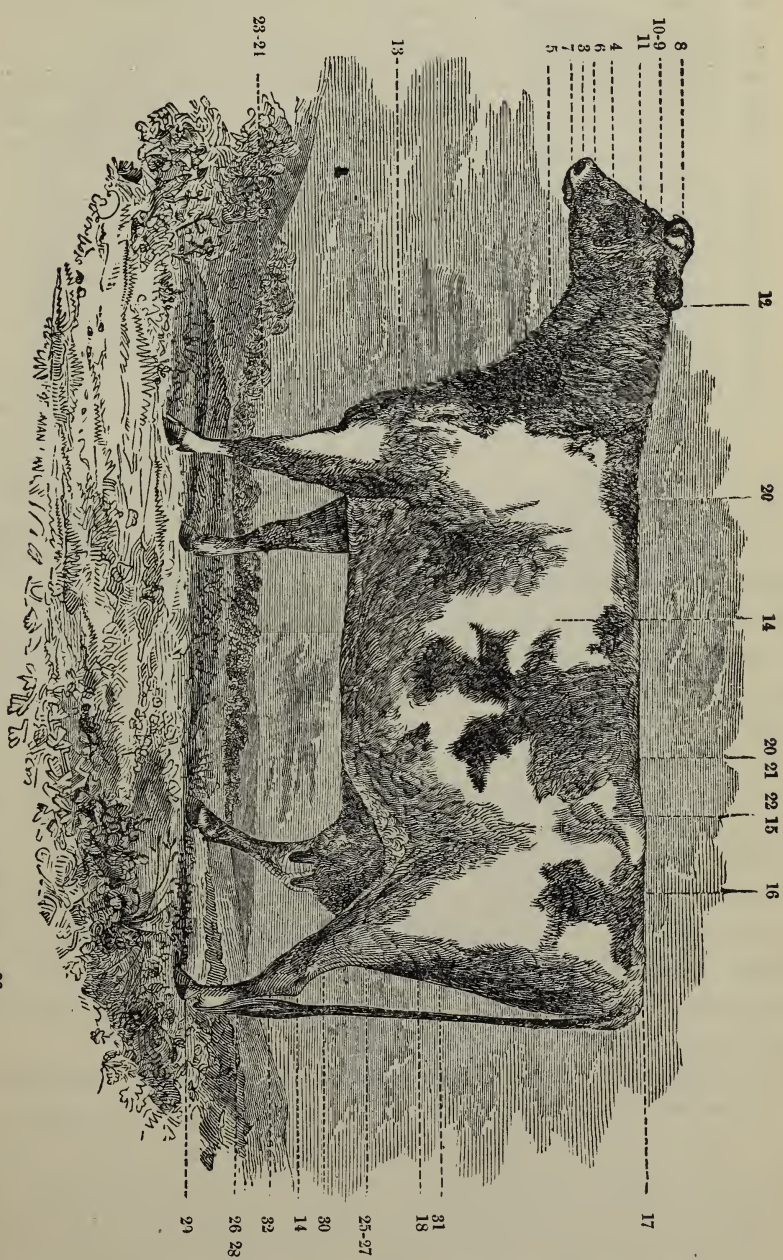
These points may be adopted in judging any cow, so far as general characteristics are concerned, deviations being only in matters of form, color, peculiar markings, shape of horns, and general contour. The Guernseys, for instance, are larger, somewhat coarser, and have of late years been placed in a family by themselves.

The scale of points given are those adopted by the Royal Jersey Agricultural and Horticultural Society, in determining the merits of animals to be passed upon:

Scale of Points—Cows and Heifers.

		Points
1.	Head,—small, fine and tapering	1
2.	Cheek,—small	1
3.	Throat,—clean	1
4.	Muzzle,—fine, and encircled by a bright color	1
5.	Nostrils,—high and open	1
6.	Horns,—smooth, crumpled, not too thick at the base, and tapering	1
7.	Ears,—small and thin	1
8.	Ears,—of a deep orange color within	1
9.	Eye,—full and placid	1
10.	Neck,—straight, fine, and placed lightly on the shoulders	1
11.	Chest,—broad and deep	1

		Points.
12.	Barrel,—hooped, broad and deep	1
13.	Well ribbed home, having but little space between the last rib and the hip.	1
14.	Back,—straight from the withers to the top of the hip	1



Model Cow. Perfection 36 Points. Illustrated.

15.	Back,—straight from the top of the hip to the setting on of the tail, and the tail at right angles with the back	1	
16.	Tail,—fine	1	

		Points.
17.	Tail,—hanging down to the hocks	1
18.	Hide,—thin and movable, but not too loose	1
19.	Hide,—covered with fine, soft hair	1
20.	Hide,—of good color	1
21.	Fore-legs,—short, straight and fine	1
22.	Fore-arm,—swelling, and full above the knee	1
23.	Hind-quarters,—from the hock to the point of the rump well filled up.	1
24.	Hind-legs,—short and straight (below the hocks) and bones rather fine.	1
25.	Hind-legs, squarely placed, not too close together when viewed from behind	1
26.	Hind-legs,—not to cross in walking	1
27.	Hoofs,—small	1
28.	Udder,—full in form, *i. e.*, well in line with the belly	1
29.	Udder,—well up behind	1
30.	Teats,—large, squarely placed; behind wide apart	1
31.	Milk-veins,—very prominent	1
32.	Growth	1
33.	General appearance	1
34.	Condition	1
	Perfection	34

No prize shall be awarded to cows having less than twenty-nine points.

No prize shall be awarded to heifers having less than twenty-six points.

Cows having obtained twenty-seven points, and heifers twenty-four points, shall be allowed to be branded, but cannot take a prize.

These points, namely, Nos. 28, 29, and 31—shall be deducted from the number required for perfection in heifers, as their udder and milk-veins cannot be fully developed: *a heifer will, therefore, be considered perfect at thirty-one points.*

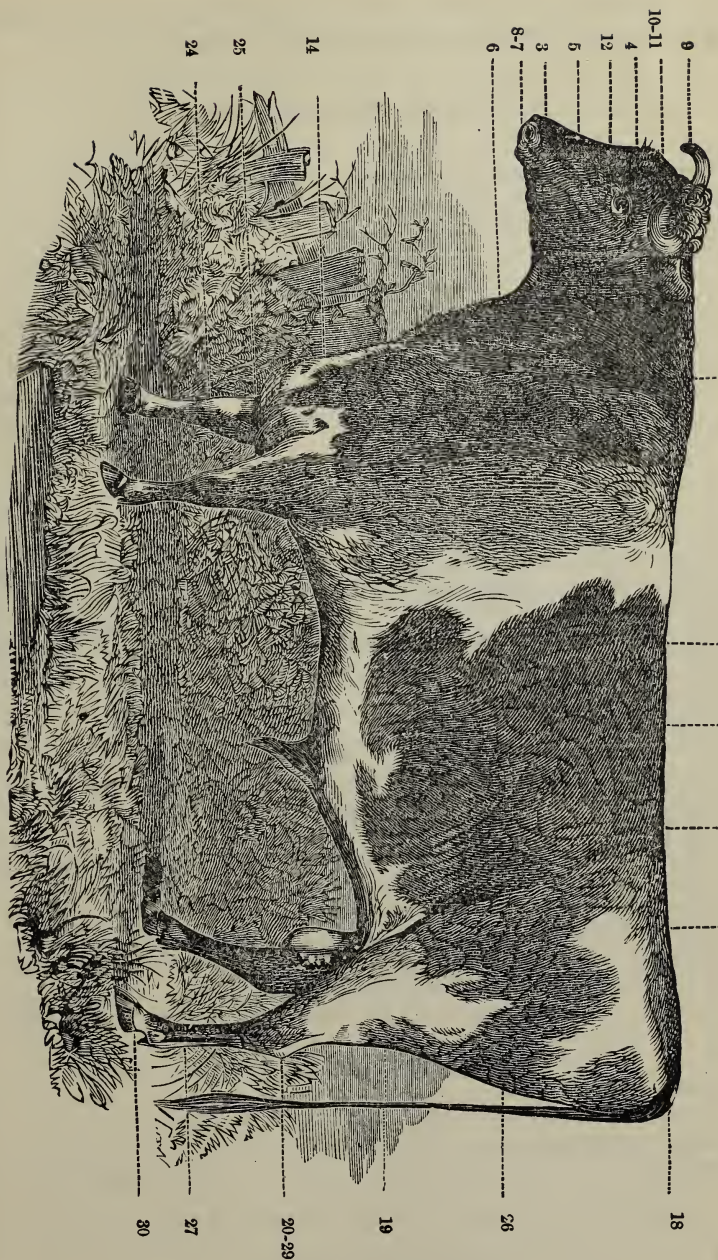
To this we add:

One point must be added for pedigree on male side.

One point must be added for pedigree on female side.

Again, the size of the escutcheon, or milk-mirrors, is a point of especial attention. This, however, will be treated in another chapter, for the escutcheon is now coming to be accepted as an indication of the milking qualities of a cow, and whatever the breed may be, strongly relied upon. And those who discard it, that is, refuse a cow with a strong escutcheon, will surely go astray.

In judging bulls, many of the same points will serve. The head will not be so small, and the forehead must be broad; the horns must be tipped with black; the neck, arched, powerful, but not too coarse and heavy; hide thicker than in the cow — certainly not thin — and mellow; fore legs short and straight, fore arm large and powerful, full above the knee and firm below it. As in cows, pedigree must have two points, one for purity of blood on the male side, and one for purity of blood on the female side



JERSEY BULL. PERFECTION 33 POINTS, ILLUSTRATED.

The portrait of a bull given above illustrates the "points" adopted by the Royal Jersey Agricultural Society, and continued after an experience of ten years without alteration. Through it the reader will easily become conversant with the points by which Jersey bulls are judged. By refer-

ence to the figures given below, and corresponding in the illustration with the points the reader will understand the following

Scale of Points for Bulls.

Article.		Points.
1.	Pedigree on male side	1
2.	Pedigree on female side	1
3.	Head,—fine and tapering	1
4.	Forehead,—broad	1
5.	Cheek,—small	1
6.	Throat,—clean	1
7.	Muzzle,—fine and encircled with light color	1
8.	Nostrils,—high and open	1
9.	Horns,—smooth, crumpled, not thick at the base and tapering, tipped with black	1
10.	Ears.—small and thin	1
11.	Ears,—of a deep orange color within	1
12.	Eyes,—full and lively	1
13.	Neck,—arched, powerful, but not coarse or heavy	1
14.	Chest,—broad and deep	1
15.	Barrel,—hooped, broad and deep	1
16.	Well ribbed home, having but little space between the last rib and the hip.	1
17.	Back,—straight from the withers to the top of the hip	1
18.	Back,—straight from the top of the hips to the setting on of the tail, and the tail at right angles with the back	1
19.	Tail,—fine	1
20.	Tail,—hanging down to the hocks	1
21.	Hide,—thin and movable	1
22.	Hide,—covered with fine and soft hair	1
23.	Hide,—of a good color	1
24.	Fore-legs,—short, straight and fine	1
25.	Fore-arm,—large and powerful, swelling and full above the knee and fine below it	1
26.	Hind-quarters,—from the hock to the point of the rump long and well filled up	1
27.	Hind-legs,—short and straight (below the hocks) and the bones rather fine	1
28.	Hind-legs,—squarely placed, not too close together when viewed from behind	1
29.	Hind-legs,—not to cross in walking	1
30.	Hoofs,—small	1
31.	Growth	1
32.	General appearance	1
33.	Condition	1
	Perfection	33

Judging by Points.

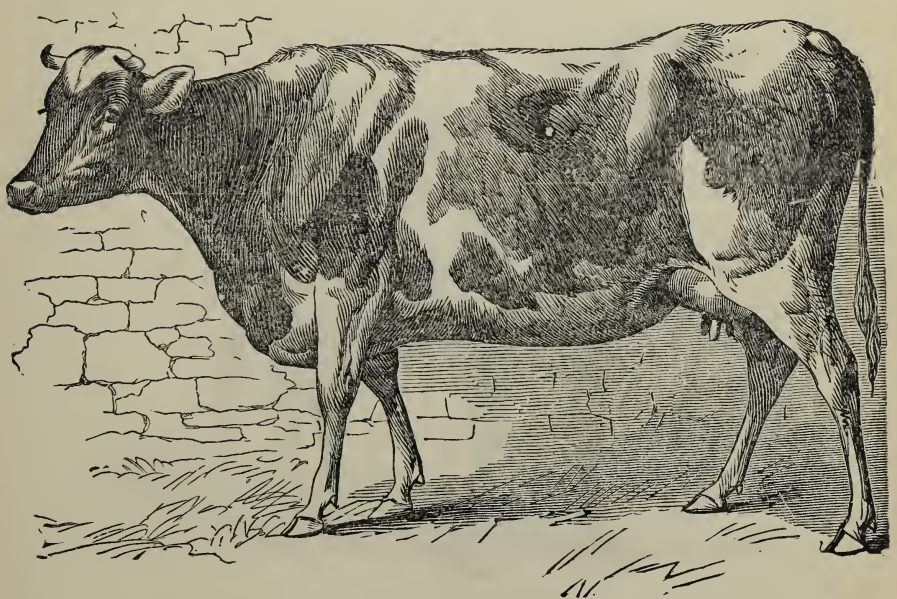
The highest excellence of any milking cow lies in the udder. This must not only be full in form, that is, in line with the belly, but it must not be cut off square in front, like that of a goat. It should be rounded, full,

presenting great breadth behind, and carried well up between the thigh. The milk veins should be full and carried well forward toward the fore legs. If knotted and with curves, so much the better.

The tail is another essential point. Whatever its size at the root, it *must* be large and tapering, and have a good switch of hair.

The chest should be broad and deep: this shows good respiration, essential to feeding and health. This, however, must not be taken in the sense in which we view it in the blood horse. It is then one of the essential points, necessary to fast and long continued exertion.

In the dairy cow, especially when viewed from before, there will be no appearance of massiveness. On the contrary, she will give an appearance of delicate fineness, and will look large behind, swelling gradually from behind the shoulders. She may not be closely ribbed, in fact should not



JERSEY COW.

be close, only comparatively so. The best milkers, every where, will be found to be rather loosely put together between the last rib and the hips, and good milkers must be roomy in the flank.

The hind quarters must be long from the point of the rump to the hock, and well filled up; yet this does not mean rounded and massive in flesh; on the contrary, the best milkers will be rather lean and perhaps high boned. Nevertheless, the same animal, when out of milk and fat, may fill up, and perhaps, present a fully rounded contour, while yet possessing all the delicacy of points characteristic of the high bred dairy cow.

A cow may have large and heavy ears; her back may not be fully straight from the withers to the top of the hips; her rump may be sloping; her tail may not reach the hocks;—all these are defects—the latter a serious one—yet, if the milking organs are super-excellent it will outweigh all these.

A phenomenon may show absolute perfection in all the points: we have never yet seen such an one. In judging, the essentials are to carefully consider each point of excellence with reference to its bearing upon the animal as a dairy cow.

A high open nostril would count but little as against a poor milk vein; a very delicate ear, nothing as against a very superior udder.

The Jersey, to the uncritical eye, when in full milk, is lean, scrawny, and misshapen; are so, fat or lean, from the standpoint of a Short-Horn

JERSEY HEIFER.

or Hereford breeder. The Short-Horn, or Hereford, is a gross, lubberly, disgusting, mountain of fat in the eyes of a Jersey breeder.

Color, Temper, and Size.

Do not be too particular about color; solid colors, and black points look well in the show ring. The animal that will turn out well at the pail, that is docile and gentle, be she what color she may, so long as she adheres to the distinguishing color-marks of the race, is the one for the milking yard.

In relation to size, the Jerseys are a small race of cattle. In no breed are overgrown animals the most valuable. With the Jersey it is especially to be avoided. So, an undersized animal is not to be countenanced. Fair size, however, is desirable.

He who seeks to increase the size of the Jersey unduly, will certainly go astray. They have been carefully bred, for many generations, with especial reference to milk.

The Jersey is the product of islands peculiar in soil, climate, and people. Transplanted to our flush pastures, with good shelter in winter, they will necessarily increase in size This is to be expected.

If you fancy "solid colors," and can get plenty of rich milk, with solid colors, well and good. If not, breed to whatever color, characteristic of the breed, which will give you this desirable result.

As a Dairy Cow.

The Jersey cow can hardly be called a dairy cow, in the general acceptation of the term. She lacks size to give quantity; as a cheese maker, she is not a success; as butter makers, they stand without equals, if quality be the test.

The butter globules of the milk are larger, and with a weaker covering than in other breeds; hence it churns quicker than the milk of other cows.

The milk, cream, and butter, of the Jerseys are yellower than that of other breeds. This is due to the excess of orange pigment secreted by this breed.

Jerseys are especially adapted to the villager, or family, requiring a medium quantity of rich milk, and superior cream and butter. They have taken kindly to our summer climate, from Maine to California. In winter, however, and in the early spring and late fall, they should be as carefully housed as Short-Horns, else they will fail to give even a moderate degree of satisfaction.

The cows are always docile, gentle, and tractable, when properly treated. It is not to be denied, however, that the bulls are often vicious. An enthusiastic writer has attributed this to their long lineage of aristocratic breeding. The Short-Horns are far more aristocratic in their lineage of ancient sires and dams; they are also notably peaceable.

It is a fact that animals kept in confinement are apt to become surly, and cross. The breeder of Jerseys must accept the fact that the bulls must be kept under strict discipline, and this by the exhibition of both firmness, careful handling, and gentleness. Otherwise, they themselves will be troublesome, and their offspring also will bear these characteristics.

VI Ayrshire Cattle.

The origin of these cattle cannot be distinctly traced. That Ayrshire, in England, has long been noted for a very superior breed of milking cows, is indisputable; yet anything like what were known as Ayrshires, fifty years ago, did not exist one hundred years prior to that time.

That the present breed was not produced by a cross of Alderney, on the native cattle of Scotland, as has been asserted, is evident enough from their form and characteristics; that they were not produced by selection, is equally as well grounded. They may have originated in a happy cross, and careful breeding thereafter.

That the Ayrshire owes much of its superiority to crosses of the better milking strains of the old Short-Horn race, would seem to be borne out, not only by tradition, but particularly by unmistakable characteristics of both these breeds.

Ayrshire indeed is eminently adapted to the production of superior milking cows. The climate is moist, with plenty of soft rains; consequently, the grasses would naturally be succulent, and tend to produce the greatest flow of milk of which a cow might be capable.

Of the three divisions of Ayrshire—Carrick, Kyle, and Cunningham—the latter is regarded as the true home of this most valuable breed. Indeed, they once went by the name of Cunningham cattle.

Ayrshires of the Last Century.

Mr. Aiton, an old English writer, who has written more largely and intelligently than perhaps any one else of this breed, has given much valuable information concerning them as they existed in Ayrshire early in the last century. Speaking of them, he says:

"The cows kept in the districts of Kyle and Cunningham were diminutive in size, ill-fed, ill-shaped, and they yielded but a scanty return in milk; they were mostly of a black color, with large stripes of white along the chine or ridge of their back, about the flanks, and on their faces. Their horns were high and crooked, having deep ringlets at the root, the plainest proof that the cattle were but scantily fed; the chine of their backs stood up high and narrow; their sides were lank, short and thin; their hides thick, and adhering to the bones; their pile (skin) was coarse and open; and few of them yielded more than six or eight quarts of milk per day, when in their best plight; or weighed, when fat, more than from twelve or sixteen to twenty stone avoirdupois, sinking offal."

The *Husbandry* of Ayrshire, published in 1793, states upon the authority of Mr. Bruce Campbell, that the introduction of the improved breed was made by the then late Earl of Marchmont, and Mr. Youatt thinks that it must have happened between 1724 and 1740.

There then were successive introductions of improved blood among them, the Dunlap strain of Short-Horn about 1780, or one hundred years ago. This breed became well established in reputation, and in the early part of the present century became regularly known as Ayrshire, and was widely disseminated in England.

MODERN AYRSHIRE COW.

The above likeness is a good one of the improved or shire cow.

Mr. Aiton describes the breed in its improved form, late in the last century, and early in this, as follows:

"The shapes most approved of, are—head small, but rather long and narrow at the muzzle; the eye small, but smart and lively; the horns small, clear, crooked, and their roots at a considerable distance from each other; neck long and slender, tapering toward the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind, the joints rather loose and open; carcass deep, and pelvis capacious, and wide over the *hips*, with round fleshy buttocks; tail long, and small; legs small and short, with firm joints; udder capacious, broad and square, stretching forward, and neither fleshy, low hung, nor loose; the milk-veins large, and prominent; teats short, all pointing outward, and at considerable distance from each other; skin thin and loose; hair soft and woolly. The head, bones, horns, and all parts of least value, small; and the general figure compact and well proportioned."

In this connection, it should always be remembered that the Ayrshire cows were always noted for their thighs, and in fact a general thinness of body, as compared with beef breeds. The bulls were always selected for their feminine appearance, especially about the neck and head; they were not required to be roomy behind; they were required to be broad in the hook bones and hips, and full in the flanks.

Tameness and docility of temper, hardiness, a sound constitution, plenty of spirit and life, and the capability of giving large messes of milk, rich in butter and cheese, are noted characteristics of this breed in an eminent degree.

Mr. Youatt says of them: "They yield much milk, and that of an oily, or butyraceous, or caseous nature; and that after she (a cow) has yielded very large quantities of milk for several years, she will be as valuable for beef as any other breed of cows known; her fat will be much more mixed through the whole flesh, and she will fatten faster than any other."

As far as milk is concerned, it is true of the Ayrshire of the present day.

In America, the breed has not yet been sufficiently disseminated to determine whether the quality of beef shall be borne out by the statement of the author quoted.

Mr. Youatt agrees that the breed has much improved since Mr. Aiton described it; that it is short in the leg, the neck a little thicker at the shoulder, but finely shaped toward the head; the horns smaller than those of the Highlander, but clear and smooth, pointing forward, turning upward, and tapering to the points; they are deep in the carcass, but not round and ample, and especially not so in the loins and haunches.

Some, however, have suspected, and not without reason, that an atten-

tion to the shape and beauty, and attempt to produce fat and sleek cattle, which would be admired at the shows, has had a tendency to improve what is only their quality as grazing cattle, and that at the certainty of diminishing their value as milkers.

Yields of Milk, Butter, and Cheese.

Experiments made early in the century, to determine the relative value of different breeds for milk and butter, we find as follows:

"In some experiments conducted at the Earl of Chesterfield's dairy at Bradley Hall farm, it appeared that, in the height of the season, the Holderness would yield seven gallons and a quart; the Long-Horn and the Alderney, four gallons three quarts; and the Devon, four gallons one pint, per day. When this was made into butter, the result was, from the Holderness, thirty-eight and one-half ounces; from the Devon, twenty-eight ounces; and from the Alderney, twenty-five ounces."

The Ayrshires average five gallons per day, and from that is produced thirty-four ounces of butter.

This shows the degree of superiority the breed has obtained in Mr. Youatt's time.

Mr. Aiton, indeed, asserted that 3 3-4 to 4 gallons of this milk would yield a pound and a half of butter, and that 27 1-2 gallons of milk would yield 21 pounds of full milk cheese; and that Ayrshires in their best condition and well fed would yield 1,000 gallons of milk in a year.

With respect to yield in the United States, we have the record that the first Ayrshire cow imported by the Massachusetts Society for the Promotion of Agriculture, in 1837, yielded 16 pounds of butter a week, for several weeks in succession, on grass feed only.

Mr. Rankin, a most reputable English authority, reporting upon a Kylo farm in Ayrshire, holds that Mr. Aiton's estimate is too high. In relation to two farms visited, upon one of which was kept from twenty to thirty cows, and on the other from thirty to forty very superior cows, he says of the first, that, "at the best of the season the average milk from each cow, is 9 Scots pints (4 1-2 gallons,) and in a year 1,300 Scots pints (650 gallons,); that in the summer season, 64 pints (32 gallons,) of entire milk will make an Ayrshire stone (24 pounds) of cheese; and 96 pints (48 gallons) of skimmed milk will produce the same quantity; and that 180 pints (90 gallons) will make 24 pounds of butter." Of the other farm, he states that "the average produce of each is 1,375 pints (687 1-2 gallons);" and adds as his belief, on the whole, that although there may be Ayrshire cows capable of giving 900 gallons in a year, it would be difficult to bring half a score of them together; and that in stocks

of the greater number, most carefully selected and liberally fed, from 650 to 700 gallons is the very highest produce of each in the year.

Upon his own farm, the size of which, he says, is of an inferior nature, his cows produce only 550 gallons in a year

Ayrshires in America.

The Ayrshires were first imported to the United States in 1831. They were different in appearance from what they are now, the colors being either deep red, or brown flecked with white, many of them having black noses. They have been materially changed since then, and vary much in color. The most of them, however, retain the characteristic colors of the breed, and whether they be dark red or black, they are generally more or less pied, mottled or blotched with white.

Mr. Allen, himself a Short-Horn breeder, in his work, "American Cattle," sums up the Ayrshires as follows;

"Their thirty-six years' trial here has been successful. They are hardy, healthy, well fitted to our climate and pastures, and prove good milkers, both as to the imported originals and their progeny. Their flow of milk is good in quantity and fair in quality; yet, we must be permitted to say, that in this country they do not yield so much in quantity as is alleged they have produced in Scotland. The chief reason for this is obvious. Ayrshire has a moist climate—an almost continuous drizzle of rains, or moisture pervading it—making fresh, green pastures; a cooler and more equable temperature in summer, and it is warmer in winter than with us.

Our American climate is liable to extremes of cold in winter, heat in summer, and protracted droughts, for weeks, drying up our herbage. These differences alone account for a diminished yield in milk from Scotch to the American Ayrshires. They have softer grasses for hay, and plenty of root-feeding in winter, which latter we have not. This fact of a diminished yield of milk on this side of the Atlantic is acknowledged by those most conversant with them in both countries.

In the year 1837, we visited the Ayrshire herd of the late Mr. John P. Cushing, at Watertown, near Boston, Mass. They were of the choicest quality, imported by himself, on an order sent out to an experienced dealer in Ayrshire cattle, "without regard to price, so they are the best." Two or three of the cows were "prize" milkers at home, and certificates, duly verified, were sent with them of the quantities of milk they had made. They had then been a year or more at Mr. Cushing's farm, and had the best of keep. We questioned the manager as to the quantities of milk the cows gave since their arrival, compared with the certificate. His answer was, "about one-third less, on an average. The best '*prize*' cow gave 33 quarts per day when at her maximum in Ayrshire, and 22 quarts

here, and the others in about like proportion, but they are all good milkers, and Mr. Cushing is satisfied with them."

We note the fact of the declension in milk of the Ayrshires in this country, knowing the same to have occurred with cows of other breeds from England. It is nevertheless true, we think, that the milk produced here is richer in the constituents, as it is undoubtedly true that cows on flush, soft pastures, or those fed on soft, sloppy food, give far poorer milk, although more in quantity, than when fed on shorter rich herbage, or upon other rich food.

Ayrshires in the West.

In the West the Ayrshires have not gained the celebrity that the Jerseys or the Holsteins have. The probability is that the Jerseys owe much of their popularity to the fact that they are *par excellence* the family cow, where quality of milk has greater weight than quantity. The latter are hard keepers; that is, they consume a large amount of food for the quantity of milk given, and probably more than either the Ayrshires or Holsteins for the quantity of butter and cheese produced. The Jersey must have rich food to enable her to sustain herself. Nevertheless, the texture, solidity, hardness and delicacy of the butter amply compensates for this. The Holstein has grown in favor in the West rapidly within the last few years. Our abundant pasture and cheap forage and grain in winter, has made them prime favorites with all that class who must have a large quantity of fairly rich milk. As a cow for making cheese they are unsurpassed, as is the Jersey for butter. For a great flow of milk, rich in butter, our experience is that the Ayrshire carries off the palm, especially on pastures not good enough for the Holsteins.

Description of Ayrshire Points.

In judging cattle of any description, reference must always be had to the characteristics of their breed. Thus, while all cattle are judged by certain undeviating standards as respects feeding and assimilation, beef cattle must be judged from a beef-making standard, and dairy cattle from their milk-producing powers. It is more than probable that, weight for weight, the Ayrshire being a cow of medium size, will produce more milk than any other breed. In selection no surer test can be had than a careful study of her points. Dr. G. Lewis Sturtevant, of South Framingham, Massachusetts, who has given the Ayrshire particular attention, and who is one of the most careful farmers and breeders in the East, thus describes the Ayrshire, and the same principles may be applied to the whole race of dairy cattle.

Usefulness.

The usefulness of the dairy cow is in her udder, and toward the udder, its shape and its yield, all the capabilities of the cow should be directed. We may first view it as a reservoir for the milk. As such, it must be large and capacious, with broad foundations, extending well behind and well forward, with distinct attachments; broad and square, viewed from behind, the sole level and broad, the lobes even-sized, and teats evenly distributed; the whole udder firmly attached, with skin loose and elastic. Such a form gives great space for the secreted milk, and for the lodgment of the glands, while allowing the changes from an empty to a full vessel. The glands should be free from lumps of fat and muscle, well set up in the body when the cow is dry, and loosely covered with the soft and elastic skin, without trace of flabbiness. Such a covering allows for extension when the animal is in milk, while the glands are kept in proximity with the blood-vessels that supply them. The necessities of the lacteal glands are larger supplies of blood from which milk can be secreted, and this harmonizes with the demands of the udder as a storehouse. For broad attachments means broad belly or abundance of space for the digestive organs, from which all nutriment must originate. The blood is furnished to the glands of the udder by large and numerous arteries. As secretion is dependent on the freedom of supply of blood to the part, and a copious flow, we find branches coming from different arterial trunks and freely anastomozing with each other. Although these arteries are internal and out of sight, yet fortunately the veins which carry the blood from the udder pass along the surface, and from their size and other characteristics indicate the quantity of blood not only which they carry away, but which must have passed through the glands from the arteries. These return veins pass both backward and forward. Those passing forward are known as the milk veins, and the size of these superficial veins on either side of the belly, and the size of the orifices into which they disappear, are excellent *points* to determine the milking probability of the cow. Still better is it to find, in addition, the veins in the perineum, which also return from the udder, prominent and circuitous.

Escutcheon.

The escutcheon is now generally conceded to be a good indication of milk in the cow. This mark is sufficiently well known not to require description in detail. I think a broad escutcheon is fully as good a sign as a long one; that quantity or quality mean more than shape, yet I would not discard the shape entirely. One error must, however, be avoided. It may be well to compare the size of escutcheon of cows of one breed

but never to compare the size of escutcheon in cows of different breeds. I think this point means more relative to size in the Ayrshire than in the Holstein or Dutch; and I am certain that while it may be safe to follow it in the Ayrshire in the majority of instances, it would be equally unsafe to adopt it in selecting a Short-Horn, for the obvious reason that that breed has been bred for generations for other purposes than those of the dairy.

The udder and its dependencies, the milk veins, and the escutcheon mark, may be considered the foundation of the Ayrshire cow. These influence profit, and also the shapes of the body and the form of the animal. The milk vessel is placed in the pubic region of the cow, and is protected on either side by the hind limbs. The breadth of its attachments secures breadth of body, and the weight requires also a depth of quarter and of flanks. The breadth below requires breadth of hip above, and length of loin here appears related to length of pelvis. So much for the physical portion. The physical function of milk-producing demands a great and continuous flow of blood, for it must not be forgotten that *milk is blood*, so to speak. This flow is dependent on the supply of food, and on the facilities of digestion. To gain this, a large body is required in order to hold the suitable digestive organs.

"To gain further room for these, we desire to see arched ribs, depth, yet no heaviness, of flank, and breadth of hips which we see was also required for the broad udder. To sustain this body, a strong, firm back is needed. To gain the most of our blood after it has absorbed the chyle from the digestive organs, reason shows that it should find its way freely and speedily through the system on its labors of supply and removal, cleanse itself in the lungs, and again pass on to its duties. All this points to a healthy heart, not cramped, and lungs of sufficient capacity; for the yield of milk drains much nutriment from the system, and the constitution must needs have the vigor given by healthy and active heart and lungs. In this way the chest is correlated with the udder.

"The reproductive functions require hock bones of good size, and a broad pelvis is desirable, as underlying within are the generative organs. Defects here are to be shunned.

"Thus the necessities of the body of a good milking cow require the wedge shape, and this not only from the flanks, but also when viewed from above."

A Summing Up.

The points of the Ayrshire cow, as given by the Ayrshire Agricultural Society, and the New York State Agricultural Society, have been summed up as follows:

The Body.

"The whole fore-quarters thin in front, and gradually increasing in depth and width backward, yet of sufficient breadth and roundness to insure constitution; back should be straight and the loins wide, the hips rather high and well spread; pelvis roomy, long, broad and straight, hook bones wide apart; quarters long, tolerably muscular, and full in their upper portion, but moulding into the thighs below, which should have a degree of flatness, thus affording more space for a full udder; the flanks well let down, but not heavy; ribs, behind, springing out very round and full, affording space for a large udder—the whole carcass thus acquiring increased volume toward its posterior portion.

"We see that the points as given are those of utility, and that at this stage the udder-points and body-points are correlated

The Skin.

"In connection with the body and the udder, the skin is of great value in assisting our judgment. Between the portion of the external covering used for leather, and the muscle, there occurs a layer of cellular tissue, which contains a larger or smaller amount of fat cells, and the mellow handling caused by these cells indicates a free circulation throughout this meshwork.

"The skin varies from a thin, papery hide, covered with silky hair, to a thick, supple, elastic hide, well coated with hair, on the one hand, and a similar variation, with harsh hair and coarseness, on the other. The thin, papery hide indicates quick fattening and a delicate constitution; the thick, elastic hide cushioned on fat, and which on the flank comes into the hand almost without grasping, indicates the height of vigor, accompanied by the fattening tendency, and the possessor of this handling endures climatic changes, low quality in his food, and neglect, with remarkable hardihood, and quickly responds to full feed and good care. The harsh handler is a dull feeder, consumes much food, and generally contains more than a just proportion of offal or waste. In the Ayrshire cow we desire neither of these extremes, for it is in the milk product that we wish the food to be utilized, and it is almost an unchanging law of nature, that deficiency in one direction must be compensated for by excess in another direction, and *vice versa*. At any rate, the cow that lays on fat too quickly is seldom a first class milker; and how well known is it that the cow of large yield milks down her condition! A cow that has a moderately thin, loose skin, of sufficient elasticity and suppleness of touch, without being fat-cushioned, as it were, with hair soft and mossy, or woolly, if of correct form otherwise, will usually milk

a large quantity, and when she becomes dry, will rapidly come into condition. In truth, the handling of the Ayrshire cow must be good; it cannot be too good; but it must not be of exactly that quality sought for in the grazing breeds.

"There, as everywhere, the dairyman must keep to his line; milk, not fat, is his profit; and in seeking excess of both, he will be liable to fall below the average of either."

Relating Especially to Milk.

It is an axiom of breeders to diminish the useless parts of an animal as much as possible, or, in other words, to reduce the proportion of those parts not conductive to profit to as great extent as possible. Applying this rule to a dairy breed, we should desire a small neck, sharp shoulders, small brisket and small bone. Moreover, small bone usually accompanies thrift, and is universally found in improved breeds. We thus have a reason for these other Ayrshire points, which I now quote:

"Shoulders lying snugly to the body, thin at their tops, small at their points, not long in the blade, nor loaded with muscle; brisket light; neck of medium length, clean in the throat, very light throughout, and tapering to the head; tail long and slender; legs short, bones fine, joints firm.

If the dairyman's policy were otherwise, he would have to supply extra food for the support of parts useless to him, and whose larger development is of no especial value.

The Head.

"The head should be small, in shape either long and narrow, or broad in the forehead and short, according to the type of animal preferred by the breeder, generally preferred somewhat dishing; the nose tapering to an expanded muzzle, with good clean nostrils. Opinions differ as to the general shape of the head. A broad forehead and short face occurs more frequently in bulls, and is generally esteemed a masculine characteristic; a more elongated face is called feminine. Yet some families of well-bred and good milking Ayrshire cows have the broad and short head, and such were, at one time, if not now, the favorite in the show-yard in Scotland.

"The eye should be moderately full, lively yet placid looking. The eye is a mirror of the disposition, and interprets the character of the cow; a fretful, irritable animal is seldom a quick fattener, and usually disappoints at the pail. It also gives expression to the features, and physiognomy aids our judgment.

"The ears should be of a good size, but thin, and their skin of rich yellow color. Coarse ears are usually found on ill-bred animals, and these may be considered, to a certain extent, indicative of general coarseness. The color of the skin, as shown inside the ear, is usually considered indicative of the richness of the milk in butter.

"The horns should be of medium size, of fine texture, with an outward and upward turn, or inclining upwards and curving slightly inwards, according to the taste of the breeder. They should be set on rather widely apart. A coarse horn may indicate a coarse and thick hide, as there seems an intimate relation between the composition of the horn, hair, and hide, and the influence of climate on horn and hair gives an appearance oftentimes of correlation between the two.

The Top Points.

"The neck should e of medium length throughout, and tapering to the throat, which should be clean or free from loose, hanging skin. Yet too thin a neck is not desirable, as it usually indicates a delicate animal. A thick-set neck, well covered yet not overladen with muscle, accompanies hardiness and vigor of constitution.

"The junction of the neck with the body and over the shoulders is called the crops; on a horse it would be called the withers. A hollow behind this point is a never-failing sign of weakness. The crops should blend in easily with a thin shoulder, lying snugly to the body. This shoulder and a well defined spine produce the sharpness of shoulder so much admired. The back should be straight, with spine well defined, especially forward. The tail long, firm in the bone, and set on a level with the back, without depression or notch. A fine tail usually accompanies fine bone, and the fine bone is not only decrease of offal over heavy limbs, but accompanies early maturity, and a tendency to thrift. The limbs should be fine-boned, flat-boned, and with joints of moderate size. On the forward limbs the cow should stand low. Large joints and round bones are found very frequently on dull feeders and on animals of little profit.

The Teats.

"The teats should be of medium length, evenly set, and project slightly outward when the bag is full, of even thickness throughout, and of fine texture. They should be placed about one-third of the length of the "vessel" apart in one direction, and about one-half the other. When the udder is not distended, they should hang perpendicularly. Large teats, however desirable to the milker, are usually accompanied by

coarseness of build in the cow. They are seldom found on well-bred animals, yet exceptionally they occur, and are much liked. A teat should be large enough to grasp, say from two to two and a half inches in length. A shorter one would be an objection; with larger, I should fear coarseness.

Color and Carriage.

"In color the Ayrshires vary greatly. Brown, red, and white appears to good advantage, and is fashionable. A good quantity of white, well distributed, adds style and showiness to the animal. Yellow and white is frequently seen, yet while this color is sometimes stated as indicating lack of hardiness, I am not aware of any proofs of argument having been brought forward to support this view. Color is as yet a matter of taste, for its correlations are hardly guessed at; and from almost pure black, through the reds to almost pure white, are colors found on the best cows. Black spots on the skin, barely perceptible through the hair, often occur on the best cattle. Strawberry-blotched and red and white are perhaps the more common colors. A self-colored animal, or a roan, or animal with white on the ears, the writer has never yet seen among the Ayrshires in Scotland or in this country, when the pedigree was unquestionable.

"The carriage should be light and active, the head well up, and the hind legs should not cross in walking. The condition should be neither fat nor lean, but that average which a good cow holds when in good flesh at calving, liberally fed while in milk."

Holstein Cattle.

Dutch cattle were undoubtedly among the first cattle ever brought to America. Canada was visited by the French in 1808, when they founded Quebec. Soon after colonists arrived and brought with them the little Normandy cattle. The English first settled on the James river, in Virginia, in 1607, and New York was settled by the Dutch in 1614. In 1625 the first cattle were imported from the mother country, and they were undoubtedly the Dutch cows noted for milk, or a race nearly allied to what are now generally recognized as Holsteins. That this supposition is correct is probably true, since these cattle were considered valuable for milk and labor. It would naturally follow that these two qualities should be considered of prime importance by the practical Dutch settlers, in a country where game in abundance might be had by all who knew how properly to aim a gun. Rearing cattle for the sake of meat would be a secondary consideration there

History of Holsteins.

In the adaption of breeds to special purposes we must always bear in mind that feed, climate, care, and careful breeding must be taken into consideration. Thus for the most excellent dairy cattle, we must look to countries noted for dairy products. In such districts will always be found tolerably uniform and excellent milkers. Really scientific breeding has not been practiced until within a very few years. It was more experiment than anything else. Yet so long ago as 1625, England, Holland and Switzerland were noted for dairy products, and also for breeds of deep and lasting milkers. As education increased, and wealth became more general, improvement by selection was supplemented by a careful study of certain points and characteristics that might be expected to perpetuate themselves. Thus we now have the Jerseys, the Ayrshires, the Swiss cattle, and Holsteins, each specially adapted to the soil and requirements of their respective localities. The Holstein cattle, or those of North Holland, are noted for large frames; for being of two distinct colors, black and white mixed. They belong to the great short-horned division of cattle, which race, from the best accounts extant, would seem to have been peculiar to the transient inhabitants of Germany from time immemorial, and to have been carried with them in all their migrations.

The size, adaptation to districts yielding strong, plentiful herbage, and extraordinary milking qualities, have made them universal favorites in the West, and wherever introduced in all that great country of the Northwest that of late years has so suddenly become celebrated for its dairy products. Within the last century this breed, like all other pure breeds, has been wonderfully improved by the astute and practical Hollanders, so that it may now be called as distinctly a breed as any other of the more reputable families. Like the Durham and Teeswater cattle of a hundred years ago, they were then noted for a fair uniformity in appearance, and as deep milkers, good at the yoke, and as making heavy weights of fair beef when ready for fattening. The general characteristics of these two breeds would seem to point conclusively to the fact that originally they had a common ancestry in cattle belonging to the ancient races inhabiting the north of Europe, and that they were carried wherever these people, in their wanderings, migrated.

Improvement.

We have no definite knowledge when this wonderfully constituted short-horned race of cattle first became broken up into the various families that have of late years become celebrated both as dairy cattle and as beef cattle. It is probably within the last three centuries that

systematic attempts have been made to breed them with a view to their careful improvement and toward fixing their characteristics — in England with the Durhams, now known as Short-Horns, and in Holland with the Dutch cattle, now known in the West through the importation of the Holsteins, from the fact that in this district more care seems to have been taken to breed their cattle, not only to type, but also in line as dairy cattle. It takes long generations of such breeding to fix undeviatingly peculiar traits and characteristics, so they may be transmitted with great fixity to the resulting progeny. The Holsteins of the present century have presented uniformity, and to-day they may be called as persistent in the transmission of quality as the other great families of the *genus Bos* in any country.

These have superior excellence in their milking qualities. They are dairy cows noted for giving enormous quantities of fairly rich milk. They have massive compact frames, and make good beef; as working oxen, from their strength, docility, patience, and fairly active habits, they should make excellent workers. The horns of the Holsteins are short. The hair short, soft, and fine. The hides are of moderate thickness, of good texture—that is, mellow. The color should be always black and white, either in bands, or else pied, mottled or spotted over the body. The udders of the cows are capacious, of great breadth and depth. The teats well shaped and standing well apart. The milk-veins prominent, large, and running well forward.

Holsteins in America.

As we previously stated, the old Dutch settlers of New York brought over with them this valuable breed of cattle. They have, however, become entirely lost, except that they have left their impress in resulting generations of mixed blood.

Since the time noted, there probably were none imported until the present century. In the early part of the century, at the time of the importation of Merino sheep, by Mr. William Jarvis, of Vermont, in one of his voyages he brought over a bull and two cows. They remained on his farm for some years; the bull was bred to the common stock of the country, producing a decided impress, but at the end of a few years the pure blood was lost.

It is recorded, that, somewhere between 1820 and 1825, Mr. Herman Le Roy, a public spirited merchant of New York city, imported some improved Dutch cattle which were sent to his farm near the city. Between 1827 and 1829, some of the produce of this herd were sent to the farm of his son, Edward Le Roy, on the Genesee river. Mr. L. F. Allen de-

scribes this herd in 1833, as he then saw them, as being large, well-spread cattle, black and white in color, and remarkable for their uncommon yield of milk, and of great value as dairy animals; their qualities in that line were universally acknowledged wherever known.

About Dutch Cattle Generally.

In treating of Dutch cattle we have adopted the name Holstein, and for the reason that in the West certainly the importers seem to have fancied the cattle found in Holstein, and to have imported more largely of them than any other of the Dutch cattle. That the right name for all those families of ancient lineage, bred in North-Holland, and recognized as having been for many generations great milkers and as making heavy beef cattle, of good quality, when dry, should be Dutch cattle, there is, from the testimony, little doubt. So also it would seem that the Holstein cattle are a sub-race of the older Dutch, as the following letter from Prof. J. G. Hengweld, of the Netherlands Royal Veterinary Institute, to Mr. Charles Muller, United States Consul at Amsterdam, would seem to show. This is dated Utrecht, November, 1872, and published in the Report of the ——— on Dutch Cattle in Agriculture of Massachusetts, second series, 1873-74. From it we extract as follows:

Quoting from Low's Agricultural History of the Domestic European Animals, etc., he says: "In comparing these varieties of cattle to the breeds of the Continent, there is an analogy found on the one side between the great breeders of the marshes and the black cattle, natives of the plains and marshes of Holland; and on the other, between the more various kinds on the north of the Humber and those of Holstein and Jutland, whence the best cattle of Northern Europe have sprung." It is not unreasonable to suppose, that these latter breeds may have been introduced during the first period of Saxon colonization by the Jutes and Angles, who settled down in that part of England. But at a more approximate period to us, it appears that cattle were frequently imported from the neighboring continent, and that they were mixed with native breeds.

It was especially the Dutch cows that were considered the best milch kinds of Northern Europe.

There is here a very clear and evident difference made between the excellent Dutch cattle and the Holstein and Jutland breeds whose origin Low traces to a Saxon colonization. How Low, a few lines further on, can make the Dutch cattle derive their origin from the Holstein cattle —from which lines the 'herd book' draws its inference (the same occurs in the French version, 'whence the best Dutch races themselves originate')— is incomprehensible; and it is evident Low errs, or is not sufficiently ac

quainted with the history of both countries. For already seven centuries before the colonization in England, of the Jutes and Angles, the Friesians [Hollanders] were known for the greater number of their cattle, as will further appear.

Every Spring, thousands of Holstein heifers are driven to the fields of Northern Germany and Holland, where people find it is more profitable to buy heifers than to raise them; and the name of the breed got confused, so that the name "Holland cow," was here translated into "Dutch cow," etc.

About Herd Books.

The "herd-book" takes the unwarranted liberty, whenever it should speak of Dutch cattle, of adding immediately after, the word "Holstein." It gives to Holstein cattle *purchased in North Holland*—and of which the first importation took place in Massachusetts in 1852, afterward in 1857, etc., but the greatest in 1861—all the honor the Dutch cattle so abundantly deserve, and appears to have made the geographical blunder of supposing North Holland, Friesland, Groningen and Oldenburg as belonging to Holstein.

The thesis so arbitrarily adopted and set forth by the "herd-book," that the large black and white cattle imported into North America from the Netherland provinces of North Holland and Friesland have "undoubtedly descended from the original stock of Holstein," as it proclaims on page 9, requires a most decided denial and refutation for the honor and reputation of Dutch cattle; and, without being led astray by the most strangely jumbled-up references mentioned, I wish to point out,—

True History.

1st. That the history of the Dutch or Holland cattle dates further back than that of Holstein.

2nd. That the Holstein cattle descended from the Dutch; and

3rd. That the name of "Holstein cattle" is only a local appellation for a peculiar indigenous breed, constituting only one of several appertaining to the same group, namely, to the groups of the Lowland races, of which *the Dutch breed is the fundamental type*. To this I now proceed.

According to the "Allgemeine Deutsche Real Encyclopedia," the origin of Holstein Schleswyck lies buried in obscurity, and Holstein was probably visited by the Cimbri; while a century after, the Roman Emperor, Cæsar Tiberius, arrived with his army and fleet before the mouth of the Elbe, without, however, setting foot on the Holstein shore. According to Tacitus, it may be stated, that the Holstein Baltic coast was

inhabited, as far as Mecklenburg and Schleswyck, by seven petty German tribes, of whom the Angles and Warnes have preserved their names down to the present time; while the others have been melted down into that of the Saxons. In the fifth century, the Saxons and Angles united with the Jutes and Friesians, and migrated to England. (This is Low's colonization.) Subsequently, the Holstein Saxons, who dwelt to the north of the Elbe, were called by the name of Normans; while the name of Holstein is not mentioned in history before eight hundred years after Christ. In 1128–64, the Holstein province Uagrien was conquered and converted to Christianity, and partly peopled with strange colonists from Friesland, Holland and Westphalia.

It appears that, with regard to its fitness as a grazing and cattle-breeding country, Holstein is of later date than Holland; which fact will appear the more prominent after some account has been made of the oldest inhabitants of Holland and their pursuits.

What History Says.

For this purpose I at once direct the attention of the reader to the coming of the Friesians and Batavians. The former were the oldest inhabitants of Holland, and were known as herdsmen, hunters and fishermen. Their history in this country goes as far back as 300 years before Christ. The Batavians came 200 years later (100 years before Christ) down the Rhine; and, although they were likewise herdsmen, they occupied themselves more particularly with hunting and fishing.

The lands of the Friesians comprised the whole country to the north of the Rhine as far as the shore of the North Sea, to which West and East Friesland belonged, composing the present Dutch provinces of Groningen, Friesland, Dreuthe, and North Holland, besides the provinces of Utrecht, Overyssell, and a part of Gulderland and South Holland. Of all these provinces, Groningen alone appertained to East Friesland.

Tacitus says of the Friesians and Batavians: "They owned cattle, not excelling in beauty, but in number." He further states, as does also Julius Cæsar, that the Friesians and Batavians paid each other in cows, sheep and goats, and gave likewise to their children as dowry, oxen adapted to the yoke and plough, cattle and horses. When they were subdued by the Romans in the first century of our era, the conquerors derived much advantage from this wealth in cattle, and imposed upon the Friesians an annual tribute, consisting of cow-hides and meat; while they chose their most valient warriors from among the Batavians.

The Friesians and Batavians applied themselves to the draining of their marshy lands and their islands, created meadows on the reclaimed soil,

which they first protected against inundations by raising hills, breakers and dikes, of which the traces are everywhere discernible along the coast throughout West Friesland and Groningen. Something is even known regarding the color of their cattle, namely, that they held those of a white color in religious veneration. It is a very plausible theory that the Friesians, who, at as early a date as three hundred years before Christ, peopled the north of the present Netherlands, and wrought those alluvial plains of Scandinavian clay into soil fit for the requirement of their cattle, did, in after-centuries, spread themselves in more northerly and easterly directions as far as the Elbe—as we already know they did, in the fifth century, unite with the Jutes and Anglo-Saxons in emigrating to England ; in addition to which, we must observe that these were probably East Friesians and not West Friesians.

The Friesians, from Oldenburg and the country near the mouth of the Elbe, both south and north of that river, were compelled, through the inclemency of those regions—then in their original condition of low alluvial swamps, inundated at every tide—to desert them. It was owing to these local circumstances that the Romans were prevented from endeavoring to land their army.

It can be shown that the inhabitants of this territory were unable to make sure provision for their own wants because of the robberies and piracies committed by the Normans, dwellers on the west coast of Denmark, people from Holstein and Schleswyck, Jutes and Angles. These were by no means peaceful breeders of cattle, as were the Friesians and Batavians, whose lands they constantly plundered and laid waste, burning and ravaging their possessions, massacring the inhabitants, making them pay tribute, penetrating far inland to the mouths of the Rhine and Yssel, and everywhere giving unbridled vent to their ferocity and love of plunder. This was between the eighth and eleventh centuries. Giving due weight to these statements, which, from the nature of the case must be necessarily brief, it cannot be doubted that the cultivation of cattle in the Netherlands existed a long time before such a thing could be thought of in Holstein. It is also quite as certain that the colonies from Friesland, Holland and Westphalia, carried with them their cattle into Holstein. Their wealth largely consisted in their herds.

Hence we see that, first, the Dutch race of cattle date from an older descent than those of Holstein; while, probably, second, the Holstein cattle originated from the Friesian breed and from that of the Dutch and Westphalian emigrants.

After this colonization, we have our attention directed to another remarkable particular in the rapidly advancing history of the Dutch cattle cultivation.

Regular Markets Established.

From the fourteenth on till the eighteenth century, a large number of Danish oxen were annually turned for pasture into the grassy meadows of North Holland—formerly West Friesland, and sold at the weekly North Holland cattle market. The oldest of these cattle markets is that of the city of Hoorn. This market was already established in 1311, and in 1839 the Danes and the inhabitants of the Eyder were allowed by Albrecht, duke of Bavaria, to hold a weekly market there. In 1605, the Danish cattle market was removed from Hoorn and transferred to Enkhuyzen, when, in 1624, the number of 1,179 oxen were sold. There was also in Amsterdam a lean-cattle market, beginning in the Spring, in the month of April, but held at irregular periods, depending upon wind and weather, when cattle were allowed to be conveyed from Denmark and Holstein hither to graze. These were mostly brought by vessel. Mr. Hengeveld says:

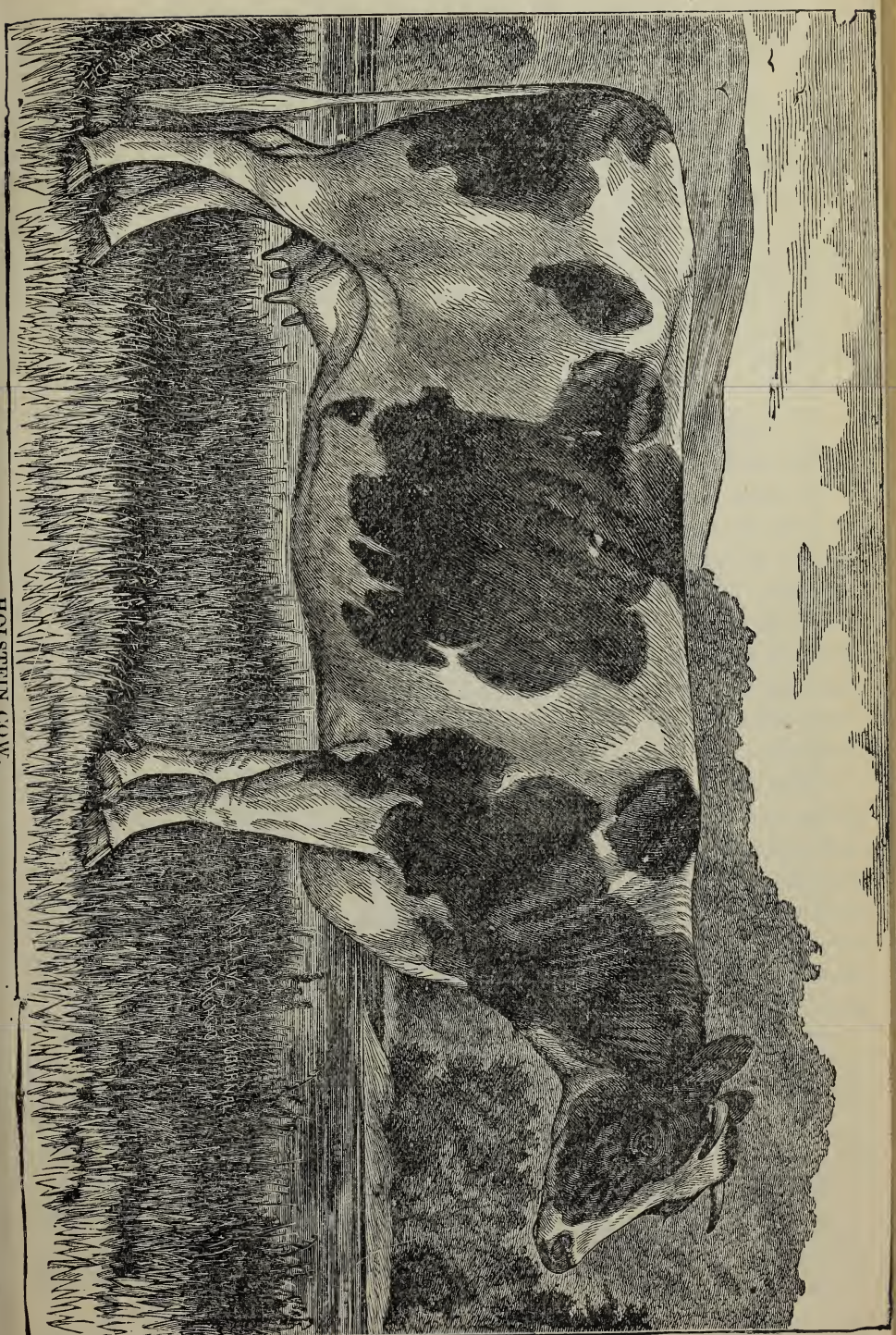
"These importations of Danish and Holstein cattle into North Holland, to which the 'herd-book' might refer, did not consist of 'heifers' but of lean oxen, which were pastured on the fertile meadows of the Polders, and afterwards sold at the markets of Hoorn, Enkhuyzen and Amsterdam as fat cattle. As to heifers, either then or now, having been imported from Holstein into Friesland and North Holland for the purpose of breeding, no such thing is known."

To withhold nothing, and to put nothing in a distorted light, I may add, that in the middle of the 18th century several importations took place into Friesland of Danish cattle, consisting of young calves. This was at the time of the raging of the cattle-plague, which desolating disease carried off thousands of the finest cattle in Friesland and Holland.

For the purpose of keeping the cattle trade alive, and to fill the places of those destroyed by the plague, small Danish breeds and German cows of diminutive size were substituted and crossed with the remaining and recovered natives.

"They were," says Scheltma, "Danish, Holstein and small German cows, of which the greater part were smaller in size than the native race." In the same work we find, "that one was reduced to the necessity, in 1769, of purchasing the needful cattle in the county of Bentheim, in the district of Oldenburg and Munster, in Hanover and other parts of Germany."

In the work, "Present State of Friesland," it is mentioned that, "owing to the cattle-plague, the people were compelled to import from abroad all kinds of *small* cattle, chiefly Danish. But, what was remarkable, however small and ill-favored these animals might be, when com-



HOLSTEIN COW.

pared with the handsome Friesian horned cattle, as a natural consequence, an improvement of food induced a favorable development of body, and, from the mixture of the two breeds, good and choice milch-kine were attained within two or three generations of the introduction of the foreign blood, no matter how much the race had in the beginning deteriorated through the process, and, eventually, the type of Danish and German cattle was quite lost." This is, however, already one hundred years ago.

A fair consideration of what has been thus far stated will leave no justification of the "herd-book's" imputation upon the antiquity and purity of descent of our Friesian or Dutch cattle; or its assumption that they are of Holstein origin. No; the genealogy of Netherland cattle is pure and unadulterated, and it is at least two thousand years old.

Facts as to Dutch Cattle.

Our authority continues as follows:

"I come now to the present time, and the question whether it is tenable to give to one variety of cattle the name of an entire group, and to reckon as appertaining to it all its several varieties or breeds,—as, for instance, the Dutch, Friesian, Oldenburg, Holstein, etc.,—and would it not be imperative in such a case to give it the purely historical name by which it is generally known? If it could be desirable to give a general name to the cattle of the just mentioned districts, then that of Holstein cattle would not be appropriate, and for it should be substituted that of *Friesian cattle*, whence all the varieties originated.

"The chief characteristics of this Friesian breed—its eminent milk-giving and fattening qualities—we find in all the just mentioned districts, and extending still further southward; with this difference, however, that wherever the land is more fertile, the climate milder, and the tending, feeding and breeding of the cattle observed with more care, in that measure, and according as these requisites stand to each other in the closest proportion and harmony, they are more developed, attain larger size and are of a finer texture.

"If the intention be to convey a correct understanding of the true qualities of the several varieties or breeds mentioned in their own dwelling places, it is better that each breed should retain the name by which it is known, and that no collective name, though a historical one, should be given them.

"In order to be able to readily classify a group of cattle of great extent, possessing the same chief qualities in form and productiveness, Sturm* proposed, so long as fifty years ago, to give to a group, subject

*Dr. Sturm: "Of Races, Crossing and Improvement of Indigenous Domestic Animals." Elberfield. 1825.

HOLSTEIN HEIFER, 2 years old.

to the same conditions of soil and climate, a name indicating those conditions, and thus originated Mountain Cattle, Highland Cattle, and Lowland Cattle. He also heads each of these divisions by the breed best representing the distinctive feature of its class, *as its type.* It is under the denomination of Lowland Cattle that he places the different breeds of the coast lands along the North Sea. Schmalz, Pabst, and many subsequent writers, adopt this classification; some with a few modifications, but all in the physical characteristics of the country to which they are indigenous, the general denomination of the collective group, according to Schmalz's statement, cattle, adopting Sturm's classification, may be distinguished in the following manner:

Races of Dutch Cattle.

"A. Lowland Race.—Primitive cow; Dutch-Friesian cow.

"B. Mountain Race.—Degenerate, quite the contrary of A; Swiss cow.

"C. Middle Race.—Highland race; forms the transition from A to B; Frankish cow.

"Schmalz says, 'To the race A belong the *Dutch, as representatives,* the Friesian, the Oldenburg, and chiefly all Lowland races bearing the peculiar characteristics which identify it with the place of its sojourn.'

"This is a purely natural division, and there is not the least arrogance in asserting, what history points out, that the Dutch cattle constitute the type of the oldest, purest, and best breed. All other varieties are of less intrinsic value; they are coarser or smaller, possess less productive qualities, though of local excellence in their native places. '*If cattle of the genuine breed are bought, imported elsewhere, and there bred, why is it not called by its native name, and why must an appellation be given to it quite foreign and unknown to it?*'

"One hears in Europe of 'Lowland cattle,' but purchases of them for the purpose of improving other breeds have, for the last hundred years, been only made in the chief Netherland provinces, where the choicest cattle of the Lowlands are found. Thus, thousands of Dutch and Friesian cattle are annually sent abroad under the name of *Dutch cattle.*"

Dr. George May's Testimony.

Finally, I beg to add quotations from Dr. George May,* director of the agricultural establishment at Weihenstephan, who visited Holland about ten years ago.

"The Dutch cattle constitute the type of the properly so-called Lowland

*Dr. George May: "The Cattle." Munich. 1863. Vol. III., p. 38

race, which extends throughout Netherlands, Flanders, Normandy, Oldenburg, and Denmark. The Oldenburg cattle descended from the Dutch race, and are likewise distinguished as East Friesian cattle, as still partially found in Hanoverian Friezland. In the adjacent parts of Bremen it is called Bremen cattle." "The Holstein and Breitenburg cattle in the Wilster and Rempner markets are equal to * * * ; but with respect to their square build, the Breitenburg cattle are in their properties more like the finer Dutch cattle."

Other writers of repute may be quoted, but enough has been given to show that the name of "Holstein" is only a local, and not a collective name, and may not be given to cattle bought in North Holland. To do so is to underrate the Dutch cattle race.

Mr. Klippart's Testimony.

In relation to the native cattle of Holstein, the lamented Klippart in his Ohio Agricultural Report of 1865, says:

"The native cattle of Holstein are the Angle cattle, which are far more numerous than any other kind or race. They are small animals, with fine bones, short legged rather than otherwise; a very fine, small head, and delicately formed neck. The predominating color is red or brown, but there are many dun, black, or spotted ones. According to the amount of food consumed, this race give a more abundant supply of milk than any other in the duchies. It is a very highly esteemed race—is much sought after for its milking qualities and kindliness in taking on flesh. The flesh is very fine, tender and juicy. On account of the great demand for stock of this race, cattle dealers have not unfrequently gone into Jutland and other points, and made purchases, which they represented as being genuine Angles; but in recent years a law has been passed that every breeder of Angle stock must brand the calves with the letters A. R. (*Angle Race,*) in order to prevent impositions.

"In these marshes are found a race of cattle much larger and heavier than the Angles, larger boned, and of a dark, reddish brown, and known as the Marsh race. This race seems to be adapted to the marshes, but does not do well on the higher and dryer uplands. Upon the rich pastures of the marshes, for a time after calving, the best cows will give from forty-eight to sixty-four pounds, (from six to eight gallons), of milk daily. But the milk is not near so rich as that of the Angles;—in fact, I was shown a statement, apparently well authenticated, to the effect that milk of the Marsh race contained no more than two per cent. of cream, while that of the Angle race contained sixteen per cent. One thing is very certain, namely: the butter of the Marsh race is not near so sweet or 'nutty' as that of the Angle race.

"In Schleswig, rather than in Holstein, are found many of the Jutland race of cattle. These have very fine bones, and are long in proportion to their height, and are, as a rule, short-legged. The prevailing color is gray, black, or gray and black mixed with white, but very rarely red or brown. This race is more highly esteemed for its early maturity and readiness to fatten than for its milking qualities."

In the transaction of the Ohio Board of Agriculture, 1872, in an article on Dutch cattle, by Professor Furstenburg, we find the following: "The breeds of cattle in Holland may be divided according to their locality as follows: 1. The breeds in the provinces North and South Holland and West Friesland. 2. The breeds in the provinces Groningen, Guelderland, Utrecht, and Overyssel. 3. The breeds in the provinces of Seeland. Although these breeds are closely related, still they show difference resulting from keeping and the various purposes for which they are bred.

Breeds in the Provinces North and South Holland and West Friesland.

"The breed most renowned in the kingdom for its milk-producing qualities is found in these three provinces. But North Holland in particular is noted for the manner of keeping cattle, which are known by the name of Amsterdam race, being no less remarkable on account of size than for the great production of milk. The pastures of North Holland are said to contain 100,000 morgen (158-100 morgen to an acre); every acre furnishes nourishment for 49-100 head of cattle. The peasants are engaged almost solely in cattle breeding, and the keeping and care which these animals receive here has almost become proverbial on account of its perfection.

"The cattle here are mostly spotted black and white; however, brown and blue or gray mixed are found. The height is considerable, being not under two Amsterdam ells (4 51-100 feet); the length of the body in proportion to the height, the middle part of which is particularly developed, the quarters fleshy, neck rather short than long, with a strong dewlap; head narrow and long, with the forehead slightly depressed; fine horns crooked forward, and large projecting ears. The withers are often narrow; the back, on the other hand, broad across the hips, which are not very prominent; the tail fine and long, with a good tuft of hair; the position of the hind legs strong and straight (not knock-kneed), the hind-quarters broad and roomy, and the bag well developed. The lower part of the legs above the hoofs is invariably white, which is regarded as a sign of the pure unmixed breed. The live weight of the cows is 1,200 to 1,400 pounds; that of bulls reaches 2,000 pounds when full grown and fatted. The cows are unusually productive of milk, and give an average of 3,000 quarts and over per annum.

"A very excellent milch cow of the 'Amsterdam race, from the royal cow stable in Eldena, which was brought with a few others to the International Exhibition, took the first premium for milch cows of the Netherland race at the International Exhibition of live stock at Stettin in 1865. This cow, fed in the stall only, gave in one year the great quantity of 6,142 quarts of milk, and kept up afterwards to 4,000 quarts in an equal length of time.

"To the breed of North Holland are nearly related those of South Holland and West Friesland, and differ perhaps only in that the latter are larger boned, and in general of not so pleasing a form. In regard to their milk-producing qualities they are about equal. The manner of keeping the stock, and the use of the milk, is also the same, viz.: the manufacture of cheese, while the calves are raised and sold as young stock at high prices. From these three provinces, the former two of which suffered so much lately from rinderpest, milch cows are bought for the best dairies in Germany.

"Holland cattle are well adapted to soiling, although at home they are accustomed to pasturage. They are kept profitably on the latter only when its abundance facilitates grazing and makes corporal exertion unnecessary. Therefore a great error would be made in placing these animals on a scant pasturage, and they are not at all adapted to the pasturage of a light soil. The result of stall-feeding is more favorable, because proper care and fodder can be given the stock without its exertion. We have received from no other race an equal quantity of milk with the same feed, as years of observation in the cow stable of the Academy at Eldena has shown.

"Three years ago (in 1865), different races were kept here, viz.: milch cows of Toudern and Breitenburg, in Schleswig-Holstein, of Ayrshire, in Scotland, and of Holland.

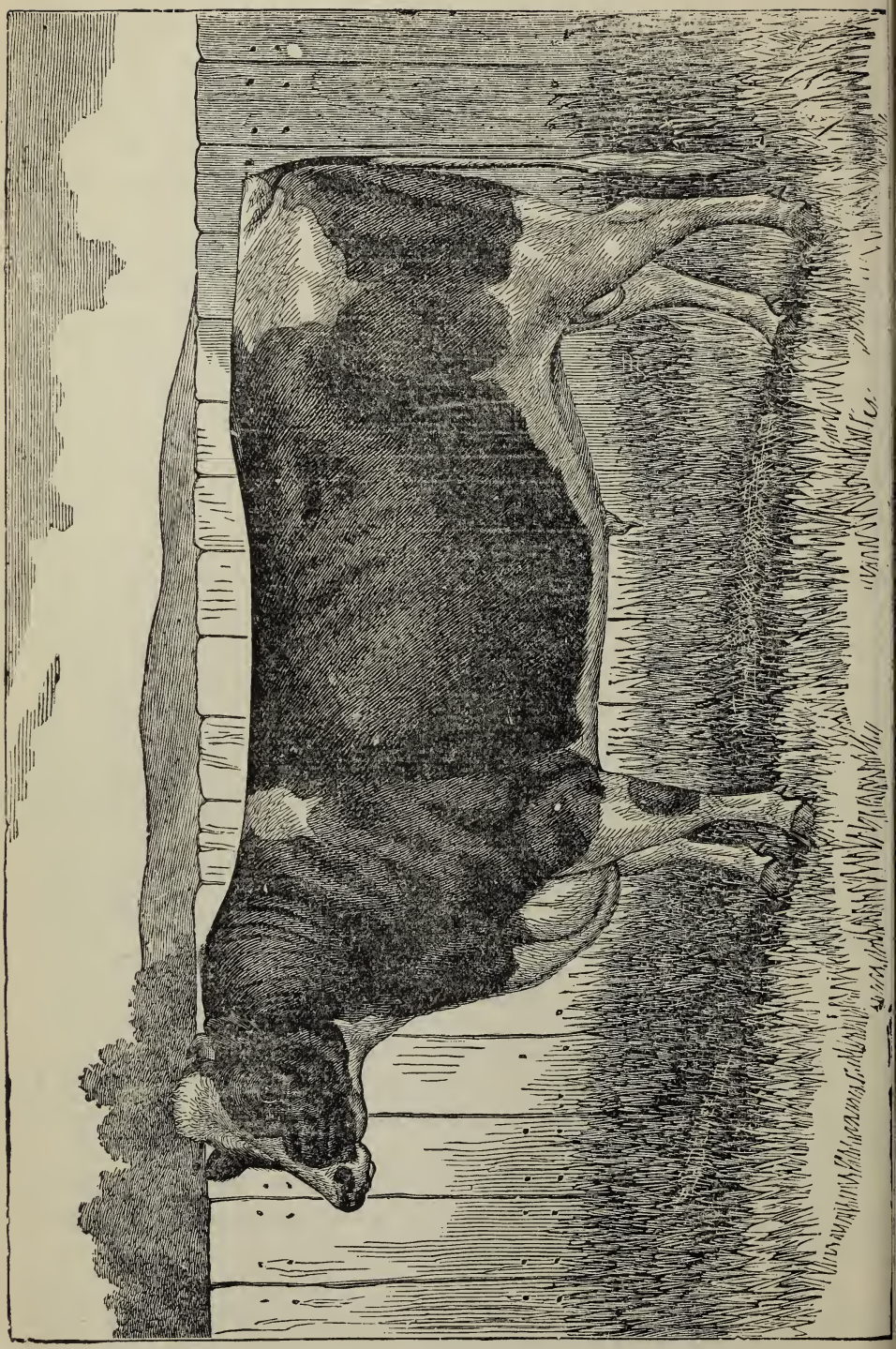
Yields of Milk.

"The yield of milk this year of these races was:

"1. Four Toudern cows gave 9,337 quarts, or an average of 2,334 quarts, or 6 3-10 quarts per day for the year. The largest milker gave 2,345 quarts, the smallest 2,020 quarts.

"2. Three Breitenburg cows gave 8,594 quarts, or an average of 2,864 2-3 quarts, or 7 85-100 quarts per day for the year. The largest milker gave 2,946 quarts, the smallest 2,820 quarts.

"3. Three Ayrshire cows gave 5,386 quarts, or an average of 1,795 1-3 quarts, or 4 92-100 quarts per day for the year. The largest milker gave 2,249 quarts, the smallest 1,415 quarts.



"Twenty-two Holland cows gave 78,100 quarts, or an average of 3,550 quarts, or 9 73-100 quarts per day for the year. The largest milker gave 6,142 quarts, the smallest 2,526 quarts.

"The average feed per head in the Winter was daily—10 pounds Summer straw, cut fine: 2 1-2 pounds oat and wheat chaff; 25 pounds beets; 10 pounds hay; 8 pounds refuse malt from beer brewery; 3 pounds rye bran. This food is considered about equal to 42 9-10 pounds hay.

"During the Summer the cows were fed daily per head 135 pounds green fodder, viz., clover and vetches (of the latter very little was used), and three times a day 8 pounds of hay."

Feeding Qualities.

"Although there is no doubt that the Holland cows eat more, generally, than the smaller Ayrshire and Toudern (for the fodder was not weighed out for each animal separately), this is of minor importance in comparison with the greater amount of milk given by the former. The greater amount of feed consumed by the Holland cows can be estimated, viz.: Nine of them stood at one crib, while ten of the smaller stood at another of equal size; the fodder was, however, divided the same in each. The proportion is as nine to ten, or when the smaller cows eat 45 pounds of hay, the larger ones eat 50 pounds.

"From the quantity of milk given, the Holland cows used a trifle over 5 pounds weight of hay to produce one quart of milk; Breitenburg used 6 25-100 pounds of hay; Toudern 7 pounds of hay; Ayrshire 9 pounds of hay. By these results it cannot remain doubtful which race is preferable."

Early Importations Retained Pure.

"Le Roy, father and son, should not have allowed their herd to become scattered and lost as a pure breed, when they subsequently turned attention to the breeding of Short-Horns. That this was the fact is evident from the record, that at the sale of the farms of these gentlemen, afterward, none but grades were found in the herd or in the adjacent country

"The first importation of animals that have been retained pure, were those of Mr. W. C. Chenery, near Boston, in 1861. This was a bull and four cows, which were successfully bred and kept pure. Mr. Chenery, previous to that time, in 1852, imported a single cow; in 1857 he made importations of a bull and two cows, and in 1859 a further importation of four more cows. With this latter importation he was so unfortunate as to import pleuro-pneumonia. The ravages of this dread disease extended

to the entire breed, and with the exception of a single young bull they were entirely destroyed. In 1861 Mr. Chenery made another importation of a bull and four cows, which came over sound. These and their descendants were the only pure bred herd in America for years. That they were the best representatives of their breed is certain from the fact that they were selected with care from the best dairy herds of North Holland, and were so certified to by the official authorities of the districts where they were bred."

Holsteins as Milkers.

As being interesting history and also as a means of comparison with their descendants and also with later importations, we give some interesting data:

The four year old bull girted 7 feet 10 inches. His length was 8 feet 7 inches; height 4 feet 11 inches, and his weight was 2,465 pounds. His color was jet black and clear white, the white being confined to the forehead, with a large patch on the withers and top of the rump; the limbs, brisket, belly, and flanks being also white.

In relation to yield and quality of milk, Mr. Allen says:

"The four imported cows, each seven years old, have an average weight of 1,325 pounds. The weight of a past two-year old heifer is 1,240 pounds. A past yearling heifer weighed 960 pounds; and the weight of six calves at an average of eight months, reared in the usual way, without forcing, was an average of 576 pounds each.

"The milking qualities of the breed may be judged by the following memoranda: One of the imported cows, when six years old, dropped a calf on the 15th of May, weighing 101 pounds; and from the 26th of May to the 26th of July, by a careful and exact record, gave 4,018 pounds 14 ounces of milk. The largest yield in any one day was 76 pounds 5 ounces (35 1-3 quarts). In ten days she gave 744 pounds 12 ounces, or an average of 74 47-100 pounds per day. She gave a good flow of milk during the season, continuing to the 24th of May following, and on the succeeding day dropped twin heifer calves, which weighed 155 pounds. The amount of cream produced from this cow's milk, in a vessel specially prepared for measuring it, produced 22 70-100 per cent of the milk, as tested by an accurate examination.

"The nutritive qualities of the milk were also tested by a thorough chemical analysis, and found to be excellent. It is also rich in its caseine, or cheese-making properties. Six days' milk of this cow was set for cream, and the produce was 17 pounds 14 ounces of good butter—nearly 3 pounds per day; and it is claimed by the owner that she is *not* the *very best* cow of the herd.

"These results show not only the remarkable productions of the cow, but the accurate and pains-taking care of the proprietor of the herd in testing their ability at the pail. Of what the food given to the cow was composed, we are not informed. We are to presume, however, that it was of the best, as every cow should have, to test to the utmost her lacteal faculties."

Weights and Milk Products.

The Holstein bulls weigh from 2,000 to 3,000 pounds, and are kind, tractable, good tempered. A half-blood Holstein steer is recorded that weighed 1,900 pounds, and some two-year olds that averaged 1,300 pounds.

In a large number of tests that have been made with Holsteins and natives at various factories in the West, the results reported showing as follows: Natives range from 5.000 to 8,000 per year; Holsteins, from 8,000 to 12,000 lbs. per year of milk.

In a comparison of Holstein and Ayrshires, the following is the report of three herds of Ayrshires, including Dr. E. L. Sturtevant's herd. The Dr. gives the record as follows: General average with 13 Ayrshires for four years, 5,543 lbs. The best year was 1872—13 Ayrshire cows (no heifers), 6, 047 lbs. Mr. E. F. Miles, of Massachusetts, gives the following yield of Ayrshires: Best year's average out of five years was 6,292 lbs., from a dairy of 11 cows; general average for five years, 5,614 lbs. Mr. F. H. Appleton, of Massachusetts, gives the following record of three Ayrshire cows for one year, average, 7,055 lbs.

It is quite safe to say that these cattle will give from 8,000 pounds up to 12,000 pounds a year. Mr. Hubble, of Onarga, Ill., gives the record of one cow, which gave 14,000 pounds in less than one year, and another which. in 1878, gave 15,960 1-8 pounds of milk.

Herd Records.

As showing the great value of any pure breed in the production of milk. Keeping in mind always that the Jerseys give exceptionally good milk, and the Ayrshire and Short-Horns the next in richness, we append a list of herds for a series of years, showing the number milked, the average yielded per cow and the average of all given breeds, which is tabulated on next page.

As milking cows the Holsteins are wonderful, as cheese-makers they are superior, as butter-makers they do not stand the test so well. In fact, Holstein breeders always tell how much milk their cows will give; the Ayrshire men, how much milk, and butter, and cheese their cows will

AYRSHIRE HERDS.

No. of Years.	No. of Yields.	Herds.	Average Yield per Cow.
11	109	Waushakum	5,229 lbs.
5	44	Cherry Brook	5,372 "
2	16	Roadside	5,334 "
1	4	Cushing's	5,705 "
5	57	Maplewood	5,583 "
3	18	New Jersey Agricultural College	6,534 "
4	38	Cochichewick	5,571 "
2	12	A. Lobby's	7,582 "
1	37	Oneida Community	5,498 "
1	8	Cornell's	6,405 "
		Average of all	5,881 3-10 "

HOLSTEIN HERDS.

3	7	Togus	5,922 "
1	5	Oneida Community	8,771 "
3	11	Miller's	8,590 "
		Average of all	7,761 "
		[Let us add to these two well-known herds].	
4	24	Col. H. C. Hoffman's	9,369 "
1	9	Unadilla Valley Association	8,384 "
		Average of all	8,876 1-2 "

JERSEY HERDS.

2	17	Togus	4,128 "
3	8	E. P. of Rhode Island	4,622 "
3	80	Deerfoot	4,658 "
1	4	Nordheim	3,808 "
1	14	Hillsdale	4,269 "
		Average of all	4,303 "
		Let us add to this list the	

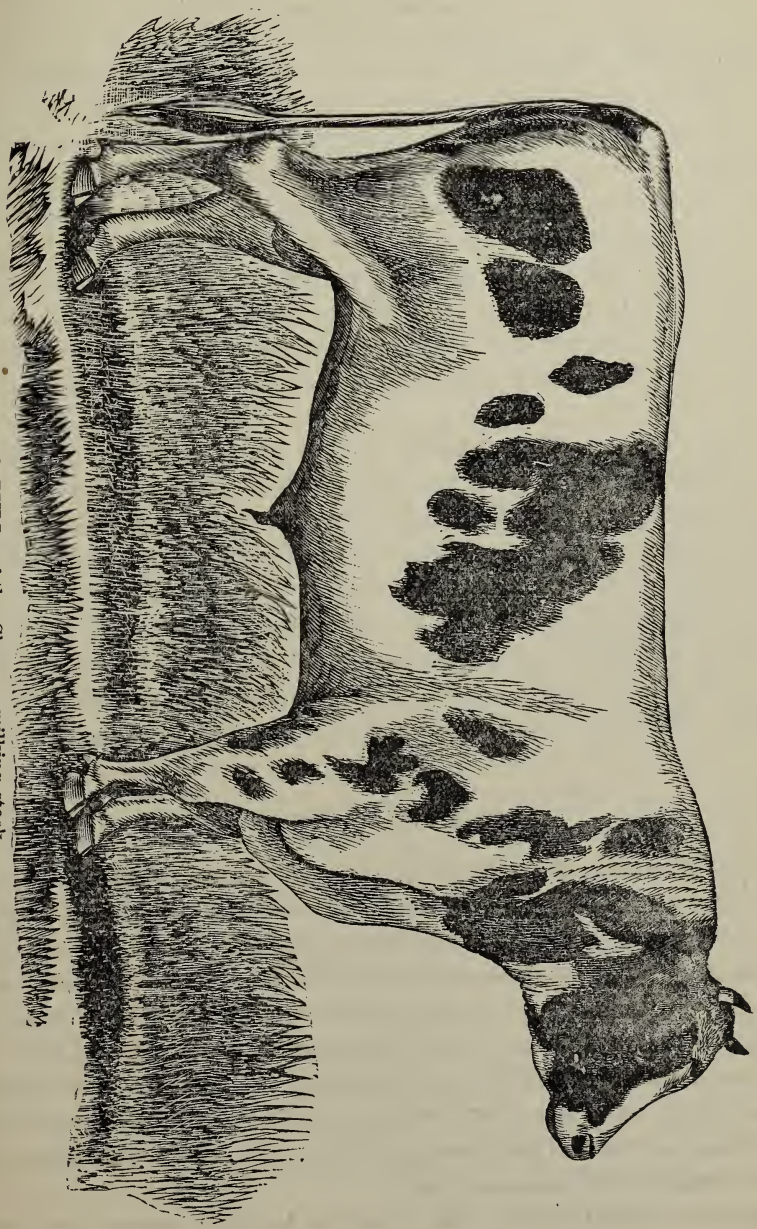
SHORT-HORN HERDS.

1	55	R. Ashburner, California	6,870 "
3	60	Harris Lewis	6,400 "
1	74	John Lea, Eng., 500 lbs cheese in 8 mos., and milk for calves—milk sold in winter	
7	35	Beauchamp's C'rt, Eng (These were samples of a large herd).	8,000 "
		Average of all	6,736 "

make; the Jersey owners, how much butter and cream to the quart of milk. To show that the Holstein is not a butter cow, the following deduced from a table published by the London Agriculture Journal, the results of tests made by Mr. Amersfoordt, of Badhoeve, in the Lake of Haarlem, Holland, a most competent authority, who tested the milk of 46 cows in June, and 49 cows in November, with Prof. Tesser's lactoscope, which is claimed to give a close approximation to the actual fat in the milk.

In the table made by Mr. Amersfoordt, the yield of each cow on the 15th of June and the 24th of November is given with the per centage of fat. The average yield of 46 cows in June, is 13.87 litres, or 31 lbs. each, and the per centage of fat 5.217. Six of the largest milkers gave 20.2 litres, or 46 lbs. per day, with 5.2 per cent. of fat.

On the 26th of November, 49 cows gave an average of 6.24 litres, or 13.92 lbs., with 6.32 per cent. of fat. The largest per centage of fat was 7.50. If the lactometer of Dr. Fesser is accurate, this would show



HOLSTEIN BULL, of the Chenery milking stock.

the Holsteins to give milk as rich as our native cows, whose milk will yield 5 per cent. of butter on flush grass in June, and 7 per cent. in

November. So considering the noble milking powers of this breed, and their well-known ability as cheese-makers, their outcome in butter should be considered satisfactory.

The Kerry Cow.

In Ireland, from time immemorial, there has existed two distinct races of cattle that were valuable in their day and time; one a long-horned breed, and the other belonging to the middle-horns and considered an aboriginal breed. Of the long-horns we have already made what mention is necessary here, except that we may add that from their resemblance to the English long-horns, they have been supposed to have had the same origin; but whether the English family came from Ireland, or *vice versa*, is not known; history is silent on the subject, and it matters but little to this generation. The middle-horns and the short-horns are the valuable cattle of the present day, and they will be the cattle of the future.

The other representative branch of the *genus Bos* in Ireland, the cattle of Kerry, or as they are now termed, Kerry cattle, are worth more than a passing mention, because there have been representative animals imported to the United States, and they may have value in some mountainous countries of the United States, and the far Northwest, for their extreme hardiness, their facility in shifting for themselves, and their adaptability in fattening when not in milk. As a breed they are rare, and even in the last century were not to be found except inland on the mountains. They are described by Youatt as small, light, active and wild.

The Kerry at Home.

The head is small, although there are exceptions to this in various parts; and so numerous, indeed, are these exceptions, that some describe the native Irish cattle as having thick heads and necks; the horns are short, as compared with the other breed, all of them fine, some of them rather upright, and frequently, after projecting forward, then turning backward. Although somewhat deficient in the hind-quarters, they are high-boned, and wide over the hips, yet the bone generally is not heavy. The hair is coarse and long; they are black-brindled, black, or brindled, with white faces. Some are finer in the bone, and finer in the neck, with a good eye and sharp muzzle, and great activity.

They are exceedingly hardy; they live through the winter and sometimes fatten on their native mountains and moors; and when removed to a better climate and soil they fatten with all the rapidity of the aboriginal

cattle of the Highlands and Wales. They are generally very good milkers, and many of them are excellent.

The cow of Kerry is truly a poor man's cow, living everywhere hardy, yielding (for her size) an abundance of milk and fattening rapidly.

These cattle usually are small, and are confined to the hilly and moor grounds. Some are of considerably size, elsewhere, and are improved in form as well as weight. The horns, usually of middle length, turn up, as do the horns of those on the mountains; they are shorter in the leg, shorter in the body; their loins and haunches are heavy and wide; although the hair is thick, the hide is mellow, and they thrive with rapidity. This is as they were known many years ago. They have since been bred with care. The London *Stock Journal* of a late date says of them now: "These characteristic points of the breed are unmistakably well marked. The size is small. The legs in most cases are very short in proportion to the size of the body. The head is somewhat small, though the muzzle is long and clean. The lips are thin; the expression of the countenance is pleasing, and the eye is particularly clear and fairly prominent. A symptom which is most indicative of purity of breed is the "turn up" of the horn, which is of medium length. Occasionally, however, the horn will, after turning up, turn backwards. The nicety of the horn and the manner in which it is set on adds immensely to the style. The neck is not massive at the junction with the head, but it thickens gradually, and affords reasonable covering to the shoulders. The latter are flat and thin. The dorsal vertebræ rise more than in other cattle, which sometimes gives the back an irregular appearance. The ribs spring well, especially the last of those approaching the hip; this makes the body very compact. The loins are of medium width, and the hip not prominent. The distance between the hip and the setting on of the tail is not considerable; the latter hangs neatly, and is well concealed by the adjoining bones. The chest is full and deep, and the hind-quarters long, but rather light. The favorite color is black, though black and white, brown, and red, are by no means uncommon. The coat is invariably fine and thick, and the hide elastic and mellow, showing great capacity for the production of flesh and fat.

"Sixteen quarts of milk per day may be regarded as the maximum quantity the best specimens of the breed will give, and twelve quarts may be regarded as a good average for the entire season. This is, of course, on good keep. The milk is rich in cream, and the butter delicate in flavor, superior in color, and, as in the case with the Jersey cows, one or two Kerries will give the milk of ten to fifteen other cows in the production of butter. As an indication of the richness of milk of the Kerry cow, eight to nine quarts are said to produce a pound of butter."

In relation to their adaptability to fatten, it is said to be a remarkable peculiarity of the breed, but they take a long time to mature. At three to four years of age they will not dress more than three to four hundred pounds of beef to the fore quarters. They are not however beef cattle, nor are they adapted, in this country, to dairying, except by mixing, to improve the messes. In fattening, however, when of mature age, they thrive most rapidly, and the beef in point of being well marbled, in flavor, and tenderness, is not excelled by that of any other breed.

With proper care and breeding, there would seem to be capabilities in this breed well worth perpetuating and improving, especially now that dairying as a distinctive branch of agriculture is assuming such proportions in the United States, and particularly in the West.

In relation to constitution, hardiness, etc., the authority last quoted says: "It is already observed, the hardy constitution of the Kerry most enhances its value; for dairy purposes especially a remunerative yield is obtained on what would be to other animals 'starvation fare.' In the depth of the winter season I have not only known the animals to live jumping from rock to rock; and from cliff to cliff, picking a coarse scanty bite from among the mountains, but with very small additional keep at the farmsteading, whither they come to be milked morning and evening, to actually thrive under the circumstances. Few people think of housing the Kerry, either night or day, at any period of the year. When not giving any milk they remain for months away concealed in the ravines of mountain passes, seeking the best shelter they can from the excessive rain and snow storms with which their abodes are periodically visited. The hair is thick but fine and long—a provision of nature typical of cold latitudes.

"What, however, is far more singular in the constitution of the breed, is the readiness with which it adapts itself to circumstances of a wholly reverse character. In acclimating breeds of cattle, sheep, or pigs, the transition must be gradual; but with the Kerry we have it suddenly and indiscriminately transferred from its home in the mountains to the richest grazing valleys which our island can boast of without experiencing the slightest change in regard to health. Not alone this, but we have seen the beasts ushered at once into the dairy sheds, and there confined for years, in the closest bondage, without any apparent effect on the constitution. They further enjoyed the full benefit of the change as well as if the new abode was their native habitation. It was for a time believed that the frame of the breed was impregnable to pleuro-pneumonia, or other contagious diseases. Recent experiments which have been conducted have failed to establish this view."

POLLED ANGUS COW.

Angus or Aberdeen Polls.

There are but three prominent beefing breeds in the world: the Short Horn, Hereford, and Angus or Aberdeen poll.

Several others are eminent both in quality and adaptability to particular circumstances, but none of them have proved equal to these three in all that goes to make the modern model ox on pasture or in the stall. Angus, or Forfarshire, in Scotland, some fifty years ago, took up the important question of the improvement of its native cattle upon the principles then well known through the successes of Short Horn breeders, and ere long immense progress resulted. Hugh Watson, of Keillor, was the principal agent and worker-up of all this. He was unquestionably the father of not only this branch of these polls, but necessarily, as we shall see, also of that of the Aberdeen line. These cattle were hornless, black, good milkers, somewhat stiff fatteners and good at living on "nothing" upon the somewhat bleak rolling pastures of Angus. The stamp of animal now on hand by Mr. Watson's skill and perseverance is consequently very hardy, grand graziers, fattening and ripening early on pasture, and, as a natural result of man's interference, also good as stall feeders.

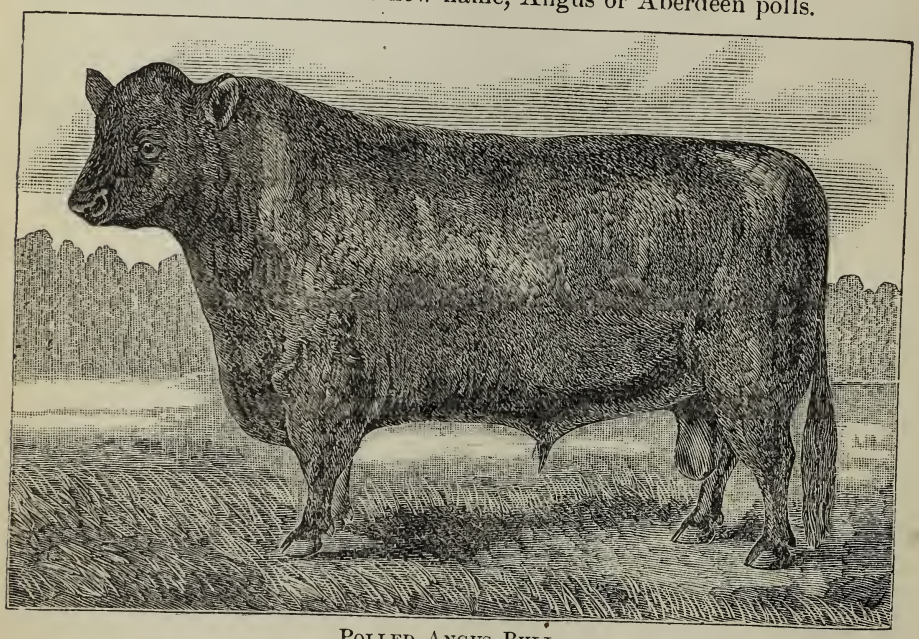
The men of those parts and times were not indifferent to the illustrious Durham, as several purchases were already in possession of the more choice farms of the north of Scotland, but, in view of securing the more valuable characteristics of England's famous beefer, along with a *hardier* constitution,

or one then supposed to be more suitable to the district, this Angus, or "Keillor Doddie" was established.

The growing importance of the Angus breed led the farmers of Aberdeenshire to consider the improvement of their own hornless black cattle, and in order to render this more certain and rapid, they made use of the larger and best specimens of the Angus.

William McCombie, of Tillyfour, stood pre-eminent in this work. His object was to secure a larger frame, and, if possible, a better stall feeder than the "Watson" type, in short, a "*Scotch Durham*," and he succeeded beyond all expectation.

These breeds had their separate herd books until three years ago, when, in consideration of their essential oneness, in history, points and characteristics, they were joined, and hence the new name, Angus or Aberdeen polls.



POLLED ANGUS BULL.

At the present day, therefore, we have a polled or hornless breed of cattle, entirely black, with occasional spots of white on the belly and udder, a deep square frame, having all or nearly all the details that make up the modern Short Horn. With the exception, then, of the color and horn, the Angus or Aberdeen poll, is practically a Short Horn, but more able to do well on indifferent pastures, is as a whole better built behind the shoulder and arm, and decidedly better in quality of milk and producing good marbled flesh, though not so deep at the pail as the average Short Horn, nor probably so heavy when matured.

It is evident from the circumstances under which this breed has been established—those of hill-side grazing, little grain, and plenty of hay, straw, and turnips, with severe winters and moderate summers, that for many parts of

the world they are superior to the Short Horn and Hereford. They have every year during the last quarter of a century so successfully competed with all other breeds that their extension in Britain and importation to most civilized countries is becoming a thing of common occurrence.

The Ontario Experimental Farm has had a herd of them for five years, and as we write (April, 1881) we read of other purchases for other parts of Canada, as well as for the United States and Australia.

In view of the great field now open for the raising of cattle upon the prairies of North America, several importations are being made of the best animals of this breed for the purpose of improving the common herds:

Galloway Cattle.

The Galloways we have seen have proved to be most admirable cattle, thick-meated, deep-flanked, short-legged, fine-haired animals. That they were considered most valuable cattle, and worthy of being brought here in the early settlement of the country, is evident from the fact that forty years ago these hornless or muley cattle, as they were termed, were not extremely rare, often breeding back by reversion entirely hornless or with but the rudiments of horns, as gentle and good milking cattle. Gentleness is a characteristic of the pure Galloway. Even the bulls are noted for their docility and quiet tempers. For the reason that this breed of cattle have of late years been growing in favor in the West as grazing and milking cattle, and for the further reason that it is thought that crossing the Galloway on the half-wild Texan will be most valuable, we append the following general characteristics of the breed.

The Galloway cattle are straight and broad in the back, and nearly level from the head to the rump; are round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins, and broad in the loin, without any large projecting hook-bones. In roundness of barrel and fullness of ribs they will compare with any breed, and also in the proportion which the loins bear to the hook-bones or protuberances of the ribs. When viewed from above the whole body appears beautifully rounded, like the longitudinal section of a roller. They are long in the quarters and ribs, and deep in the chest, but not broad in the twist. There is less space between the hook or hip-bones and the ribs than in most other breeds, a consideration of much importance, for the advantage of length of carcass consists in an animal being well-ribbed home, or as little space as possible lost in the flank.

The Galloway is short in the leg, and moderately fine in the flank-bones—the happy medium preserved in the leg, which secures hardihood and disposition to fatten. With the same cleanness and shortness of

shank, there is no breed so large and muscular above the knee, while there is more room for the deep, broad and capacious chest. He is clean, not fine and slender, but well proportioned in the neck and chaps; a thin and delicate neck would not correspond with the broad shoulders, deep chest and close, compact form of the breed. The neck of the Galloway bull is thick almost to a fault. The head is rather heavy; the eyes are not prominent; and the ears are large, rough and full of long hairs on the inside.

The Galloway is covered with a loose mellow skin of medium thickness, which is clothed with long, soft, silky hair; the skin is thinner than that of the Leicestershire, but not so fine as the hide of the Short-Horn, although it handles soft and kindly.

The prevailing and fashionable color is black; a few are of a dark brindle brown, and still fewer are speckled with white spots, and some of them are of a dun color. Dark colors are uniformly preferred, from the belief that they indicate hardiness of constitution.

The Galloway cows are not good milkers; but although the quantity of milk is not great, it is rich in quality, and yields a large proportion of butter. A cow that gives from twelve to sixteen quarts per day is considered very superior, and that quantity produces more than a pound and a half of butter. The average, however, of a Galloway cow cannot be reckoned at more than six or eight quarts per day, during the five summer months, after feeding her calf. During the next five months she does not give more than half that quantity, and for two or three months she is dry. There is, perhaps, no breed of cattle which can be more truly said to be indigenous to the country, and incapable of improvement by any foreign cross, than the Galloways. The Short-Horns almost everywhere else have improved the cattle of the districts to which they have traveled; at least in the first cross produced manifest improvement; but even in the first cross the Short-Horns have done little good in the Galloway, and, as a permanent mixture, the choicest southern bulls have failed. The intelligent Galloway breeder is now perfectly satisfied that his stock can only be improved by adherence to the pure breed, and by care in the selection. While this is undoubtedly true of all pure or thorough-bred stock, it seems especially so of the Galloways to-day. It does not however follow that pure breeds may not improve the mixed stock of a country. They must and do, as the magnificent Short-Horn, Hereford and Devon grades amply testify in all our great markets. That the Galloways have many valuable points cannot be denied. One of these is their absence of horns; another is their extreme docility. If by crossing Galloway bulls with Texan cows their horns could be toned down their wildness tamed, their frames thickened with superior flesh,

heir milking qualities improved, and the whole animal ameliorated, it vould seem as possible with the Galloway as by any other means we :now. It is certainly well worthy of trial.

Texan Cattle.

Within the last few years certain theorists have harbored the idea that he immense herds that cover the great plains of Texas, Mexico, and America are a race native to the soil, and that have existed there from ime immemorial. Such however is well known not to be the fact. As vell may the great droves of horses that occupy the same region be said o be a native and wild race. On the contrary, their well known char-:cteristics, and similarity to the Spanish cattle and all that country including Austria, Hungary, and other regions bordering the Mediterranean, Black ind Caspian seas, points distinctly to their origin, if, indeed, it were not vell known that they were introduced by the Spanish settlers about the vear 1500 and succeeding years. In fact, neither cattle or horses were :nown in America prior to the Spanish invasion, and that they have mul-:iplied so amazingly since is due to the genial climate and abundant)asturage, so that the original cattle brought by the Spaniards succeeding he discovery of the various countries along the Gulf of Mexico and South America, has caused them to spread over all the region from Cali-'ornia to a latitude south, bound only by a line beyond which the coldness)f the climate precluded constant Winter and Summer herbage.

Unlike the wild buffalo, a race indigenous to America, cattle are not migratory to any considerable extent. Not so much so as horses. Hence while the buffalo is found in Summer far north, even into the British pos-sessions, cattle have never been found beyond the limits of abundant Summer and Winter pasturage, and they have never been brought into subjection by the wild Indians of the plains as were the horses, that escap-ng from domestication gradually increased and occupied in a wild state nany valleys to which cattle never reached.

Characteristics of Spanish Cattle.

This race of cattle should therefore be called Spanish cattle—what hey really are; gaunt, bony, long-horned cattle, semi-wild, capable of great endurance of heat, and adapted to the dry but fertile regions they nave gradually overrun. So vast has become their numbers that ten vears ago these cattle were estimated at 4,000,000 in Texas and New Mexico, being in point of numbers about one-seventh of all the horned :attle in the Union. Semi-wild, impatient of restraint, lean and lank in)ody, high-boned, furnishing but little meat, and that of an inferior

quality, giving little more milk than wild buffalo—scarcely enough for a few months Summer support of a calf—they were for generations run down like wild beasts and slaughtered for their hides and scanty tallow. The gradual settlement of the country, and the increasing demand for beef, both in Europe and America, at length caused them to be moved north into Kansas for summer pasturage, whence they were driven to the nearest railway station, shipped east and slaughtered, either for packing or sold at an inferior price for consumption of flesh.

Various attempts have been made to reduce them to subjection to man so they might be divided into small herds to be confined in pastures or fed in winter. It has been in every instance unsuccessful. They remain shy, wild, irritable, and refuse to fatten kindly. The writer, immediately

A TEXAS STEER.

after the close of the war, having a large quantity of forage and fattening material, with mills for grinding corn, and stables for the accommodation of 450 cattle, on account of scarcity of stock was obliged to put in Texans.

Feeding Texans in Confinement.

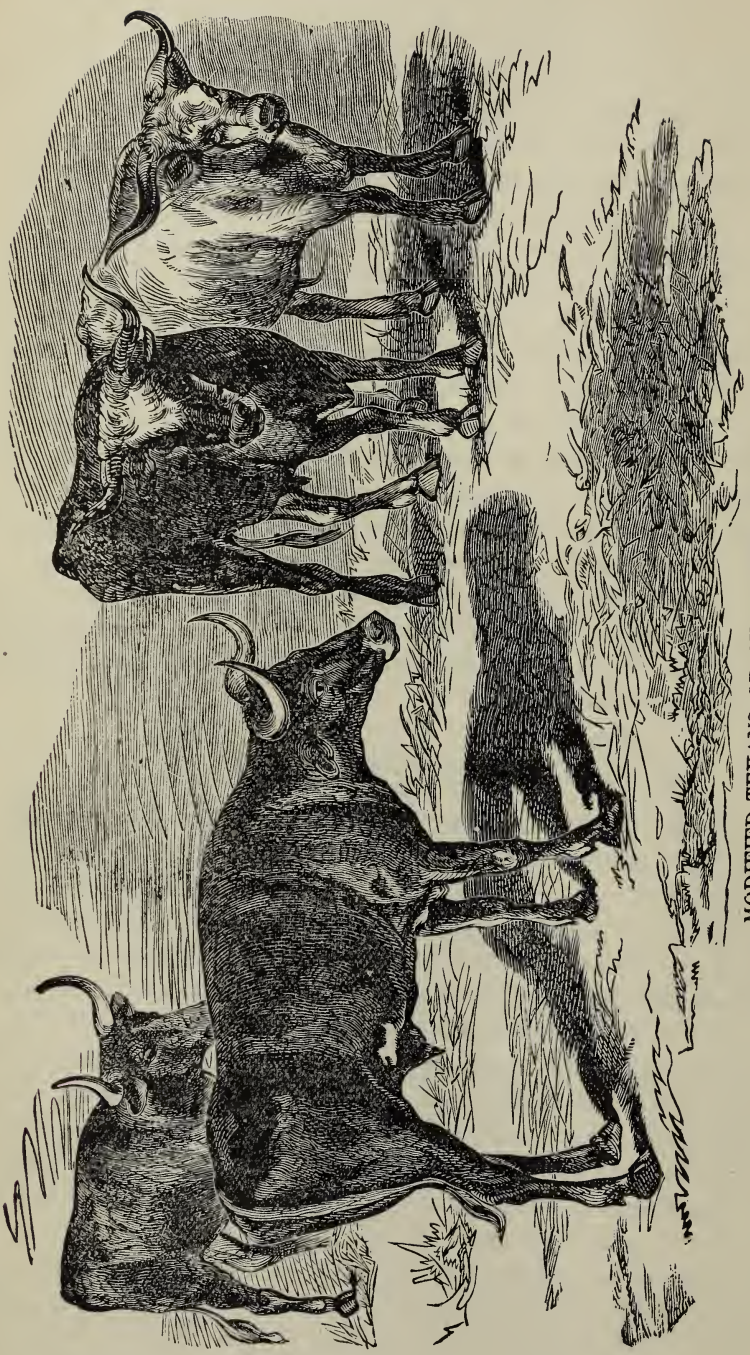
They were bought in Kansas and were known as Cherokee cattle, a modified form of Texans, bred by the civilized tribes of the Indian reservations occupying the territory between Kansas and Texas. They had to be lassoed and dragged into the stables and made fast to the stanchions,

from which they could not be allowed to escape until turned off in the Spring. Underground pipes conveyed their drinking water, the feed, ground corn and hay, together with residuum from a mill was conveyed to them by cars on tramways running between each two lines of cattle. The stables were kept only light enough so that the workmen could see to feed and clean; good ventilation was provided, and at the end of six months they were turned out, and shipped to New York,—good ripe cattle so far as Texans could be made such,—and brought the price of fat cattle in the market there. Of this lot only two car-loads were culls or unfit for the New York market. They were strictly corn-fed, or rather meal-fed. For the first month they were sulky and savage, refusing to take kindly to their rations. They never became so quiet that strangers could be allowed in the barns without danger of throwing them off their feed, and yet they were altogether superior to the ordinary Texan cattle of ten years ago in point of docility, for they had been closely herded. Nevertheless, the one experiment was sufficient. If other cattle could have been had at a fair price it would not have paid to have fed them. At that time good cattle were high and scarce, Texans were cheap. The ledger account came out all right in the Spring, but the writer did not care to try the experiment a second time. As to how they looked when off of grass and ready for the stable in the Fall, the full page illustration we have prepared will show:

Weight of Texan Cattle.

The average weight of full grown Texan steers as usually sold from grass in the Western markets, may be stated at 1,000 pounds; of this the average beef and bone will be 400 to 450 pounds; of the balance, except the hide, it is pretty much offal, the tallow being exceeding light. Of late years very many Texas cattle are yearly bought for feeding in distillery stables, on the slop made in the manufacture of high wines. They are roped and fastened and remain there until sold to the butcher. Others again are bought in the Autumn and shipped to the vast corn-fields of Kansas, Iowa and Illinois, and fed in the fields during the Winter. They really take more kindly to this latter system of feeding than any other, and they will gain about two hundred pounds of flesh during the Winter, weighing an average of 1,200 pounds, and making in the neighborhood of 700 pounds of beef.

From what we have stated it will readily be seen that there is no profit in breeding Texans, when other cattle may be kept. There are, however, vast outlying territories where the herding of these cattle is found profitable. In Texas, New Mexico, the Indian Territory, Western Kansas and



MODIFIED TEXANS, OR CHEROKEE CATTLE.

Nebraska and Dakota, in the valleys of Montana and Wyoming, they may have unlimited range, and enjoy their semi-wild condition, and fattened on grass may be shipped east to be slaughtered and barreled for export, or fattened as we have previously stated. Of late years enterprising herdsmen have bought great quantities of Short-Horn and Hereford bulls to be used in the improvement of their stock. The effects are already apparent. It is well understood now that the produce of either of the bulls we have mentioned, in the first cross, produce an animal much superior to the dam, and which will sell at three or four years old for nearly double what the natives will. The cows give a largely increased quantity of milk, they make better and fatter calves; and here again is a conclusive illustration to the breeders of cattle everywhere, of the utility of improved breeds in inducing early maturity, increasing the weight and improving the quality of the beef.

Profits in Breeding Grades from Texans.

Within the last ten years fortunes have been made in herding Texas cattle, not only in that State, but in various Territories of the United States. There are two essential requisites; plenty of good grass for Summer and Winter pasturage, and abundance of water. The latter is *the* essential. Many persons have failed in their efforts to profitably breed Texas cattle on the plains, for the reason, that water was either not near, or insufficient in supply. The cattle must go long distances to slake their thirst, and consequently become very dry and uncomfortable before starting to the watering place. Then they drink such immoderate quantities of water, as again to be uncomfortable for some time, and will, if allowed, hang about the water, on scant grass, until again forced to take the range. Thus they cannot gain in flesh uniformly, but on the other hand, absolutely lose condition in the constant travel necessary to get water. Perhaps some epidemic sets in, and they die by hundreds, and the owner finds himself the loser, simply from entering into a business hastily, and without studying carefully the absolute necessities in the case.

There is another class of failures. These have been persons who have supposed they could take fifty cows, and make money by herding them until grown up. In all that wild region inhabited by Indians more or less predatory, the force about a ranch must be strong enough for some protection. The profits must come principally from the increase in cattle. If the small herder has water privileges, he can make money if he has stock enough. If he has but few, the expense of herding will be the same as when the herd is larger. Owners of other and large herds, or those seeking to become such, will not take kindly to the appropriation of water

privileges, for so small a drove. There will be quarrels; cattle will be stampeded, and get mixed with other herds, and at last the owner will be obliged either to leave, or take a partner with sufficient capital to properly stock the ranch.

The yearly increase in value of cattle on the ranch will be all the way from 25 to 50 per cent. according as the business is managed. In northwest Texas the value of cattle on the ranch is for yearlings $6; two year old $10; three year old $13; cows $12 to $15; beeves $15 to $20.

The Cattle Interest of Texas.

To give some idea of the vast numbers of cattle in all that region where there is abundant pasturage and water, it has been estimated that, from the Red River, in Clay county, west to the Pease River, and south to the Colorado, embracing a territory of perhaps twenty-five thousand miles, the whole region is now stocked to its fullest capacity, and in the better portions thereof, it is estimated that an average of one head may be kept to eight acres. The loss in cattle may be estimated at about four or five per cent. per year, and the expense of herding 300 head and their produce, has been given as follows:

DR.	
To three hundred cows and calves	$ 3,000
To two imported bulls, $125	250
To one man's time and board for five years, $300 per year	1,500
To one man's time and board for three years, $300 per year	900
To sundry items of expense	350
Total	$ 6,000

CR.	
By three hundred five year olds, $18	$ 5.400
By three hundred four year olds $15	4,500
By three hundred three year olds, $12	3,600
By three hundred two year olds, $10	3,000
By three hundred one year olds, $6	1,800
By three hundred old cows, $10	3,000
By two bulls, $100	200
Total	$21,500
Less loss 25 per cent	5,300
	$16,200
Original investment	6,000
Profit in five years	$10.200

This is approximately correct, except as to the value of the bulls, if by these are meant acclimated thorough-bred bulls of Short-Horn, Hereford, or Galloway blood. It is well known that it is useless to take mature bulls or other cattle raised in the North, to Texas. They die off with Texas fever before they have time to leave their impress to any

considerable extent. An acclimated bull two years old past, should be worth $250. Not less than three such bulls should be used in the herd of 300 cows. The second year 150 heifers will be in breeding condition, and the increase will then be increasingly fast. The fourth year two more bulls must be bought, and at the end of the five years, the three first bulls will be practically of little value. With these exceptions, the figures may be taken as correct.

Acclimating Improved Bulls.

The serious losses that have constantly occurred from the death of thorough-bred bulls sent to Texas for the purpose of infusion of blood has prevented, to a great extent, the improvement of the stock. In all the plains regions of the West this difficulty has not been so severely felt. The improved breeds take kindly to the Summer climate and only require protection in Winter, and if put with a herd in which the germs of Texas fever have been eliminated are healthy. Not so those taken to Texas. Whatever the cause of the disease, it is certain that nearly every animal taken there has succumbed to this dread disorder, if placed immediately in the herd, and generally before they have had time to serve more than from twenty to forty cows, and from weakened condition the impress they have left has been deficient in vigor to that of either the sires or dams.

Select Your Bulls.

To obviate this a thorough system of acclimation must be established. And above all none but very young animals should be taken. In every case they should be calves of early Spring, bought when they are eight months old. The cars in which they are carried should be carefully prepared, to provide for the comfort of the animals. Pay particular attention to feeding and watering regularly so as to keep the bulls vigorous and strong.

Buy none but animals of parents and families of known soundness and vigor of constitution. Avoid all fancy or highly in-bred families. Abjure excessive style and fineness, and look only to the single points, *constitutional soundness and vigor, and thick beef.* It is better that they be a little rough from having been bred out of doors, and with out-of-door care, rather than stable bred, pampered animals. Such are not even fit to put with the breeding herds of the plains. To carry them to the very home of Spanish, or as it is now called Texas fever, can only result in loss. When they arrive establish them in good, well ventilated stables,

and under the supervision of a keeper who fully understands both breeding and raising, and do not allow them to mingle with the native cattle until they are at least two years old; and, no contact should be allowed with stock that are known to show indications of the malady. One more suggestion: the bulls should not be freely used as breeders until they are twenty months old. In acclimating the bulls, watch for the first symptoms of the fever, and give prompt treatment at the first discovery of the disease. This may be known by the restlessness of the animal. The eyes will be dull, the movements constrained and moping, there will be more or less straining in the attempt to urinate; that voided will be scanty, high colored, and of bad odor; and the bowels may be costive or very much relaxed. Treatment, said to be most successful, is to give at the first indication of the disease one tablespoonful of finely pounded charcoal, and one teaspoonful of ground ginger, to be followed in an hour with a quart of strong decoction of marsh mallow, and one quart of camomile tea. This to be repeated in ten hours if the animal does not get relief. If marsh mallow can not be obtained, salt peter is recommended. This remedy, however, had better be given under the direction of a veterinary surgeon. Above all, endeavor to keep the pores of the skin active by brushing and friction. By proper care in this direction it is stated that ninety per cent. of the cases treated can be saved.

In all this, care of course must be taken in regard to the food of the animal. Bran, boiled oats, and corn, or corn meal, may be given; if roots, carrots, parsnips, or sugar beets can be had they will be excellent. In fact they should always be kept in supply on breeding farms. Grass in plenty and of good quality should also be supplied freely.

A Texan's View.

An intelligent and educated correspondent of the *Live Stock Journal*, gives the following excellent advice in relation to the transportation, care, and feeding of stock bulls to be carried to Western Texas. He advises that care should be used in the selection of calves of stout, robust frames, the offspring of sires and dams of good constitutions. Calves dropped in the early Spring will be found most suitable for shipment say about the last of November or early in December. Plenty of milk from birth until September should be given them; then they should be fed on wheat bran, boiled oats, and crushed corn, until date of shipment, and if kept in stables during the day they should have a good grass lot to graze in during the night. They should be handled, made very gentle, and well broken to the halter. The cars for transportation should be well bedded, and food for the entire trip transported with the stock.

Arrangements should also be made for through trip when starting. Food, water, and careful watching by the herdsmen will land them at the place of disembarkation but little damaged by the trip. Care should be taken not to crowd too many in one car—thirty head can be taken if they are properly cared for—yet twenty-five head would do much better. The calves designed for shipment in one car, if more than one is to be sent, should be permitted to run together for some time previous to starting.

After reaching the terminus of their wearisome journey by rail, a week's rest, in dry lots, should be granted them, with the same kind of food as was used before shipment. When taken any distance slow and easy travel should be given them. If either costiveness or its opposite is exhibited, simple remedies should be given to prevent the too active purging or relieve the constipation. The preparation for their reception at their Texas home should have been completed before their arrival; and in addition to a supply of corn, oats, and wheat bran, pure running water and free access to a growing oats or barley patch, which should have been sowed in early Autumn for their benefit, should be allowed. Suitable protection must be provided to guard them from the cold blasts of the "northers;" then, by prompt attention to any symptoms of fever and the immediate use of charcoal and ginger, one table-spoonful of charcoal and one tea-spoonful of ginger will relieve them.

If December and January are passed without fever you can feel safe from its ravages until the rains of Spring, followed by the heat of June, when the *ticks* and *vermin* menace them. Then avoid exposing them to either rain or sun, and destroy the vermin by a free use of coal oil and lard, using two parts of the latter to one of the former. If only Spring calves are brought there will be less of fever than if older animals were brought.

Too many speculators, who bring young stock to Texas, stint and half starve them, thinking that to keep them in good growing condition increases the chances of disease. My observation teaches the reverse to be true. To secure a complete development of bone, flesh and growth, and early, profitable maturity, a calf must have generous care, plenty of nutritious food, good water, and kind treatment. I have heard men complain that Texas Short-Horns are not thrifty and handsome, like those exhibited at Northern fairs. The reason for the dissimilarity is readily found on investigation to be that the one had excellent feeding and growing, while the other—in addition to a long winter, starvation, and acclimation, with a Spring and Summer with rain and hot sun—had his vitality almost destroyed by *ticks* and *vermin*. Cattle from the North cannot be acclimated unless generous food, comfortable quarters, and

kind treatment are given to them during their first year in Texas; and unless this treatment be kept up they are worthless when acclimated. They will be weak and sickly in spite of the best efforts to the contrary. Care as to condition of animals will always pay. That which costs us the greatest pains in cattle raising will always reward us the best.

CHAPTER II.

BREEDING AND FEEDING.

In the breeding of animals, one must have a definite object in view. We have already stated that in this age of civilization, where industry is divided and subdivided, so that each set of workmen have separate and distinct lines of labor in the make up and finish of the most simple articles, so in stock breeding, the farmer must understand the nature and adaptation of his soil, and its adaptability to certain crops and animals. In rocky, hilly, and comparatively barren regions, or where the soil suffers under drought, the farmer cannot compete, either in the raising of beef cattle, or in dairying, with the more favored well matured countries of deep soils and flush pastures. Again, in a country noted for its short, sweet perennial pastures, and cold springs of water, the stock breeder cannot compete with the dairyman. The stock feeder of cattle and hogs must be in a region where corn, or other feeding grains can be cheaply and abundantly raised. Fortunately, such countries are well adapted to the meadow grasses, producing heavy crops of hay and pasture.

About Grasses.

Here again, the grasses cultivated will be somewhat different The stock feeder will depend shiefly upon blue grass, timothy, red top, orchard grass, and clover, and where blue grass is natural to the soil, he will depend almost solely upon this grass, for late fall and winter feeding, as he will upon blue grass and orchard grass for spring feeding, depending later on clover, timothy and red top. The dairyman, while he will depend upon clover, timothy, red top and orchard grass for hay, will not use these for pasture exclusively. He must have in his permanent pastures a great

variety of grasses. His pastures, to produce the greater quantity and best quality of milk, must be permanent ones, and the older the better. This with a moist climate is what has made some sections of England, and especially Ireland, Holland, and Denmark so celebrated for their dairy products. This, also, with the peculiar care given in feeding, has made England and Scotland celebrated throughout the world, not only for the heavy weight, and superior quality of the beef, but it has resulted in such superior beef cattle as the world has never before known. Some of these breeds, transplanted to the United States, have taken kindly to our soil and climate. The wonderful fertility of the land lying west of the Alleghanies and north of the southern line of Tennessee, and especially those States bordering upon the Mississippi and Missouri rivers, and principal tributaries, and, also, the great Southwest — this teeming fertility of soil has made all this great region of country the true home of the most celebrated breeds of cattle—where they have reached weight, and richness of milk given, no where else attained except in very confined areas.

What Breeds are Best?

This becomes a most important question. In all that great region of the West, of gentle undulating prairies or grassy plains, Short-Horns and Herefords will be found the very best cattle to breed from, when only beef is the object. If labor and beef are wanted, the Devons and Herefords will be found most valuable. If beef and milk are to be the products, the Duchess and Princess families of Short-Horns, and the Holsteins will give the best returns. If dairying is to be the chief industry, then, for butter, the Ayrshire, with a few of Jerseys intermixed will produce the best results. If for butter and cheese, Ayrshire or Short-Horns. If cheese alone, the Holstein, and for quantity of milk given this latter breed will certainly carry the palm. If milk and butter, without reference to quantity, be required, the Jersey is the cow. All the breeds except the Jerseys will make good weights of beef and fatten readily when dry — the Short-Horns, Holsteins, and Ayrshires making weight in the order named. For milk, we have not included the Devons; occasionally a cow will be found giving a large mess for her weight. Devons, however, are not dairy cows, at least, now-a-days; having been bred most exclusively for their superior quality of marbled beef, and their uniform excellence, courage, and kindliness in the yoke.

How to Breed.

All farmers cannot become breeders of highly bred, pure stock. For this the animals must be isolated from all other breeds of the same race.

At least the males must be strictly confined, so they may not intermix with others. Where farms join, divided only by fences, this will not be found practicable in a majority of cases. One's neighbor may fancy scrub stock. They are notoriously breachy. Once they intermingle with a pure breed, the taint of their blood is not only found in the calves, but in the dams themselves. In the calves and their progeny, it may never be bred out. We see the Kyloe cross in some families of Short-Horns, even to this day, cropping out in single individuals after a lapse of nearly a century. The writer so saw it at the last fat-stock show in Chicago—that of 1879. The animal was a most excellent specimen; fully as perfect as many of the very highest breeding, yet the taint of the family was there and the breeder of "high caste Short-Horns" would not have bred from such a cow or to a bull showing the taint, at any price.

About General Utility.

Just here is where the difference comes in, as between breeding for general utility or absolute purity of blood. The breeder for general utility cares not so much about a particular strain of blood, as he does to get certain characteristics that will furnish him, at the least expense, either the most beef, the best working oxen, or the most and the best milk. Those who undertake breeding, or in fact any other business, in a haphazard way, always fail; the only exception to the rule being pure luck. Luck is not a good business integer to depend upon. Like lightning, it never strikes twice in the same place.

There is another thing in connection with luck that it is well to bear in mind. It is as apt to mar as to mark. The farmer, therefore, who undertakes the breeding of stock, with a view to the money they will bring from the butcher, or from the sale of dairy products, must be guided by an entirely different set of rules from that of the breeder who breeds solely with a view to selling sires and dams to other breeders of pure stock. So particular, now-a-days, have breeders of this class become that some of them will breed only particular families. Some will not allow a Booth cross, others abstain from the Bates blood.

Many high caste breeders are pretty well agreed that a top cross of what are known as seventeens, and some other sub-families of later importations, and also of particular bulls of pure breeding, but which have been considered more or less coarse, must be rigidly excluded. They have their particular fancies. To gratify this fancy they will pay extraordinary prices, while the great mass of really superior and really pure Short-Horns will be passed unnoticed. It would be unadvisable for the ordinary farmer, or even the Short-Horn breeder to buy these

"terribly bred cattle." And the farmer must carefully discriminate. Let him get staunch healthy cattle to start his herd, if beef be the object, and animals with good milk points if milk be the object, rather than to strive for color. So long as the color of the animal is characteristic of the race, the beef points and the milk points are what he should seek. The body in the beef animal, and the udder in the dairy cow, is what he wants.

Breeding in Line.

Breeders of pure stock are especially particular in the selection of sires; so much so that many of them breed solely with reference to the strain of blood particular families contain, the selection often being without reference to the uniformity or quality of the animals selected. Really, however, breeding in line means the selection of males of a common type, and belonging to the same family. Thus in breeding in-the-line, the expert, while he objects to going out of a sub-family, nevertheless seeks to couple animals together whose uniformity is identical, or, when one is weak in some essential, to improve it by coupling therewith an animal of superior excellence in this particular. Thus, if the head and horns be rather coarse in an animal, it is bred to one fine in head and horns, but not lacking in other essentials. It is one of the most fatal mistakes that can possibly be made in breeding, that to acquire one essential other disabilities be allowed to enter. Many breeders have committed irreparable injury to their stock by not understanding the necessity, while trying to improve one essential, of keeping all others intact. Therefore the sagacious breeder will pay more attention to those points indicative of heavy succulent beef laid in the primer points and without an undue proportion of fat, if combined with general symmetry, rather than style and carriage, connected with deficient characteristics in flesh. The one animal may be striking to the eye, while the other will bring the butcher's money. This is really all there is to beef cattle.

Form as an Index to Quality.

Whatever the animal, its form, organization and general make up, will be an indication of its true type and character. It is a fixed law of nature that this should be so. A few illustrations will suffice, and which will easily commend themselves to the reader.

The thorough-bred horse, is courageous, high strung, active, sinewy, impatient under restraint, and not given to carry much flesh or fat. The heavy draft horse, carries much flesh, is docile, honest at the collar, pos-

sessing great bone and sinew, and is on the whole more sluggish. The horse of all work should be a modification of both these characteristics. All horses have great chests, and consequently great lung power, fitting them for severe and long continued muscular exertion. They must be judged by a standard where muscular exertion is the important integer. Cattle have been bred so long with reference to their bodies, as beef or milk producers, that they have become so distinct from the supposed wild type as to possess but little in common therewith. The head, neck and limbs, have been refined, the lungs have less power, since it is only necessary that they supply sufficient oxygen to the blood to keep up a uniform animal heat under exercise, never violent. The loin and rump are broadened, the ribs spring out more to give capacity for a stomach of size to digest a large quantity of food. In swine the diminution of lung power is particularly seen. They are essentially slow in all their movements, and averse to exertion. Their forte is simply eating, sleeping and laying on fat. No one would mistake a hog for either an ox or a horse. The intelligent breeder so educates his eye and his touch, that he can distinguish between animals of any given race as to their capabilities for the purpose intended. The external conformation comes at length to be so keenly associated with the correlated structural affinities, that he tells at once, and exactly, the important points that would entirely escape the uneducated eye and touch.

Practical Suggestions.

As the greatest excellence in the production of meat, milk or labor in cattle; of wool and carcass in sheep; and of hams, loin, side meat and lard in hogs, involves peculiarities of structure and function—adapting the animal to the special purpose for which it was intended, and as all these require close study of anatomy, physiology, and the correlations existing in the different forms of production; and since scientific breeders have for the last hundred years been seeking to establish a higher and higher excellence, the intending breeder would be unwise to undertake to breed up from the common herds of the country. It would be time ill spent. He should first inform himself of the practical necessities within his reach, and breed from types already existing rather than create one. This will simplify his study, he must educate his eye by points and the observation of the best animals, and his touch by feeling them according to the rule heretofore given; and this brings us to

Breeding Grades.

At the meeting of the American Association of Short-Horns, at Indi-

napolis, 1872, "pure-bred," "full-blood," and "thorough-bred," were defined as being synonymous terms, and to indicate "animals of a distinct and well-defined breed, without any admixture of other blood." The following definitions were adopted by the association.

"'Cross-bred'—Animals produced by breeding together distinct breeds."

"'Grades'—The produce of a cross between a 'pure-bred' and a native.'"

"'High grade'—An animal of mixed blood, in which the blood of a pure-bred predominates."

The produce of a Devon and a Short-Horn would be a cross bred animal. In-and-in breeding is considered to be the coupling of animals of the closest relationship, as the produce of one sire and dam, etc. Close breeding is the breeding of animals together that are closely related; as animals one or two removes from the parent stock, in relationship. High breeding is sometimes incorrectly used in this connection; it is wrong. Many of our most highly bred horses are not closely related, and the same may be said of our pure cattle. High breeding properly signifies the selection of the breeding stock, within the limits of some particular family, and within a definite standard of excellence and characteristics.

How to Breed Grades.

Select the best cows you can find, that is, those that come the nearest to the standard of excellence for the purpose wanted; then select a bull combining in the most eminent degree possible the points of real excellence for the outcome expected, not in fancy breeding but in adaptability to the end sought. Thus, if for beef, he should be of fair size, not too large, certainly not too small, but of excellent fineness combined with great loins, rumps and thighs, round-ribbed, and well ribbed to the hip bones,—in other words, what a breeder would call a well-bred, serviceable animal.

If for milk, the bull must have come of a line of uniform milkers, for here the udder and milk-veins are the essential part. In fact, the male must possess the peculiarities characteristic of the breed, and better if from a family of extraordinary excellence. Why? Such animals are prepotent; that is, they will impress upon their progeny the distinguishing characteristics and excellence of their race. By following the directions we shall give, in ten years one may have grades bred to such excellence that none but the most critical judges of stock can tell them from pure bred cattle.

Start the Herd

With one yearling bull for each ten two-year-old heifers, selected as we have stated, and which have not been bred. Keep them from contact with other cattle, and especially keep their own bull as much in their sight as possible. The next year's produce should be ten calves, one-half of which should be heifers. Geld the steers, and make what use may be desired of them. Rear the heifer calves in the best manner possible, and with their sire and dams when in the pasture, and at other times do not allow them to see strangely marked animals, especially when in heat.

At the age of two years breed them to their sire. He will now be four years old, and should be kept simply in good flesh, not really fat, certainly not lean; but strong, vigorous and healthy. When these calves are two years old, breed again to the same sire, and so on to the fourth generation, if he last so long with vigor.

Thus this produce will inherit 15-16 of the blood of the sire, being the fourth generation from the original sire and dam. It may be formulated thus: at one year from starting the herd, you have the first generation, at four years the second; at seven years the third; and at ten years the fourth generation. They will grade as follows: First, one-half bloods; second, three-quarter bloods: third, seven-eighths bred; and fourth, fifteen-sixteenth bred.

Besides these you will also have generations successively from the original cows, or seven-eighths, three-fourths and one-half bred heifers corresponding with the succeeding years from the first. If these again have been bred to the same bull, or another pure bred bull, their produce will be respectively fifteenth-sixteenths and seven-eighths bred.

Ten Years' Produce.

Let us now figure how much stock, young and old, will be the produce of this system, allowing that none have died. In one year, from the ten cows and one bull, we have ten calves, five heifers and five steers; the second year, ten calves, the third year ten calves, the fourth year ten calves. This year we have also five calves, the produce of the first year's calves. The sixth year we will have twenty-five calves, the seventh year thirty, the eighth year thirty-five, the ninth year forty, and the tenth year forty-five calves as the produce of the original cows and their progeny, making in all two hundred and forty animals ranging in age from calves to thirteen years old, of which one hundred and twenty-five should be females.

Selection.

Just here selection may come in. Some of the cows and their progeny will have proved superior beef makers or milkers, according as they were originally chosen. Their progeny should be carefully raised and bred. It may seem dreadful, this incestuous breeding, but please remember, it is animals that are the subjects. The records of the improvement of animals and their erection into fixed breeds, will show very much closer in-and-in breeding than this. The object is not only to throw the good qualities in a lump, but to fix them by concentration. Thus a cow bred during her whole breeding life to one bull, never having had contact with another, will bring her calves nearer and nearer to the sire year by year, through the infusion of the blood of the sire into the dam, through intercirculation by means of the fœtus, during its growth.

As showing close in-and-in we find in the first volume of the American Herd Book a diagram of the breeding of Comet from Hubback, and Lady Maynard. It is explained as follows:

1. Bull, Hubback.
2. Dam of Haughton.
3. Richard Barker's Bull.
4. Cow, Haughton.
5. Bull, Foljambe.
6. Cow, Young Strawberry.
7. Bull, Dalton Duke.
8. Cow, Lady Maynard.
9. Bull, Bolingbroke.
10. Cow, Lady Maynard.
11. Cow, Phœnix.
12. Cow, Young Phœnix.
13. Bull, Favorite.
14. Bull, Comet.

In relation to Favorite or Lady Maynard, Mr. A. B. Allen says: It was conceded by a company of old breeders in 1812, in discussing the question of the improvement of Short Horns, that no stock of Mr. Colling's ever equalled Lady "Maynard" the dam of Phœnix, and granddam of Favorite (by Foljambe) and of young Phœnix (by Favorite, her son, upon his own mother,) the dam of Comet 155) so celebrated as having been sold for 1000 guineas $5000) also by Favorite, a specimen of as close-in-and-in-breeding as can perhaps be found on record.

To show wonderful depth of in-breeding with continued good results, the cow Clarissa may be mentioned; she possessed sixty-three sixty-fourths of the blood of Favorite. Her pedigree runs thus: "Cow Clarissa, roan, calved in 1814. Bred by Mr. R. Colling, got by Wellington (680) out of—by Favorite, (852)—by Favorite,—by Favorite,—by Favorite—by Favorite—by Favorite—by a son of Hubback.

Wellington, the sire of Clarissa, was also deeply inbred with the blood

of Favorite. Taking the two pedigrees—that of Clarissa and Wellington together—they will read thus:

1. Bull, Hubback.
2. Son of Hubback.
3. Cow, by son of Hubback.
4. Bull Favorite.
5. 1st cow by Favorite.
6. 2nd cow by Favorite.
7. 3rd cow by Favorite.
8. 4th cow by Favorite.
9. 5th cow by Favorite.
10. 6th cow by Favorite.
11. Clarissa.
12. Bull Wellington, sire of Clarissa.
13. Bull, Comet.
14. Cow, Wildair.
15. Cow, Young Phœnix.
16. Cow Phœnix.
4. Same bull Favorite on the side of Clarissa's sire as on the side of her dam.
17. Bull, Bolingbroke.
18. Granddaughter of Hubback.

Exercise Common Sense.

In breeding so closely as we have advised it will be necessary that intelligent judgment be used. The effect of in-and-in breeding is to refine and render delicate the constitution. Animals closely in-bred, in fact all highly bred animals require better care than those of a coarser nature. They are not as able to take care of themselves, to shift for themselves; are in fact artificial. But on the other hand they will repay the care and attention bestowed, in increased profits for the food given. In in-and-in, or other very close breeding, care must be taken to give the animals an out cross as soon as you find they are suffering in constitution and hardiness; in fact when you find they are no longer getting better and better seek another sire, and so continue until you have got animals fully equal to any thorough-bred for all practical purposes, and that shall at the same time be marked with vigor as well as the characteristics wanted, whether they be for beef or milk, or both.

Once having begun, however, with pure sires on native stock, never by any chance allow a grade animal to become a sire, no matter how good he may be. It can only result in loss, whatever the attempt at improvement be in animals of any kind. In swine in-and-in breeding may not be carried so close as in other animals. They are scrofulous and weak lunged at best, and close breeding soon shows in the progeny. As a rule one-half or three-fourths bred are good enough to bring enhanced profits over those usually denominated land-pikes, a picture of which may be found in another part of this work.

Gestation of Cows.

There has been much surmised first and last upon the subject of the length of time of gestation, and its effect upon the sex of animals produced. It is a prevalent idea that if an animal goes over her time a male will be the result. Let us see how careful records kept by scientific men will tally with this.

Mr. Tessier, a most accurate and acute observer for over forty years, embracing various animals, gives results of over 575 cows and these subsequently having been extended to 1,131 cows the extremes were not changed but results as to averages are as stated below.

Upon the 575 cows the results were as follows: Twenty-one calved between the 240th and 270th days, the mean time being 259 days.

Five hundred and forty-four calved between the 270th and 299th days, the mean time being 282 days.

Ten calved between the 299th and 321st days, the mean time being 303 days.

Earl Spencer has also carefully tabulated the period of gestation of cows as we find in the table on the following page.

In these 766 cows the least period was 220 days; the mean 285 days; the longest period 313 days. He states that he was able to rear no calf produced at an earlier period than 240 days. Thus it may be accepted that, according to Tessier, a cow may carry a calf 321 days and produce it sound; and from the fact that Tessier and Earl Spencer agree almost exactly as to the meantime of gestation, (1,895 cows being observed), 285 days or nine and a half months may be taken as the average time of gestation of cows, slight variations being allowed from this for different breeds.

Earl Spencer was inclined to the belief that a cow would carry a bull calf longer than a cow-calf. In stating the case, he says:

"In order to try this, the cows who calved before the 260th day, and those who calved after the 300th, ought to be omitted as being anomalous cases, as well as in cases in which twins were produced; and it will then appear that, from the cows whose period of gestation did not exceed 286 days, the number of cow-calves produced was 283, and the number of bull-calves 234; while, from those whose period exceeded 286 days, the number of cow-calves was only 90, while the number of bull-calves was 152."

The author, however, omitted to notice that all the calves born after the 299th day were females, and of those born before the 260th day, 10 were females and 15 males. And again, omitting the twin-calves, 340 were females and 401 males—a large excess of bull over cow-calves. It

TABLE RELATIVE TO THE GESTATION OF COWS.

Number of Days of Gestation.	Cows.	Cow calves	Bull calves	Twin cow calves.	Twin bull calves.	Twin cow and bull calves.
220	1		1			
226	1	1				
233	1		1			
234	1		1			
235	1	1				
239	1	1				
242	1		1			
245	2	2				
246	2		2			
248	1	1				
250	1	1				
252	2		2			
253	1		1			
254	1	1				
255	2		2			
257	2	1	1			
258	3	1	2			
259	1		1			
262	1		1			
263	2		2			
266	1				1	
268	2	2				
269	2		1			1
270	5	2	1	1		1
271	6	5	1			
272	3	1	1		1	
273	3	2	1			
274	5		5		1	
275	5	2	2		1	
276	15	7	6			1
277	14	10	2	1		1
278	18	11	4	1		2
279	32	16	11	3		2
280	35	15	20			
281	36	20	18			1
282	47	26	20	1		
283	54	30	24			
284	66	33	33			
285	74	29	43			2
286	60	22	38			
287	52	25	27		1	
288	42	13	28			
289	45	20	25			
290	23	10	13			
291	31	9	22			
292	16	5	11			
293	10	1	9			
294	8	1	7			
295	7	3	4			
296	6	2	4			
297	2	1	1			
299	1		1			
304	1	1				
305	1	1				
306	3	3				
807	1	1				
313	1	1				

is also curious in this connection to note, that of the 764 cows, 23 produced twins, or one cow in 33 1-3 of these; 7 cows had twin females; 5, twin males, and eleven had twin male and female calves. Those in the twins produced their owner 18 female calves and 16 male calves.

From the many facts collected in various races of animals, it is quite safe to conclude that the sex of the young has no particular influence on the period of gestation. It is more probable that heredity, sires, early maturity, and various other integers in the problem, may control the tendency to long or short gestation.

Food vs. Product.

The value of an animal depends upon the profit it will give in comparison with the care and expense in rearing and fattening, in the case of beef cattle, and, of the cost of feeding, in comparison with the milk yield, in connection with dairying. In this we may safely conclude that an animal will produce less and less gain the longer it is kept, and thus early maturity becomes the most important integer in the breeding of stock, whether it be for beef or milk. The reason why the mature animal consumes more in proportion to gain than the younger one is, that it takes a certain amount per pound of live weight to supply waste. The animal of a given age, according to breed and adaptability to fattening, can only arrive at a certain weight. Hence this ultimate weight reached, it will not increase. Long before this ultimate weight is reached, the animal will increase only in fat. Thus the flesh-forming element in the food is wasted, save that which supplies the daily waste in the animal economy. Thus from the data which we now present it will be seen how much may be considered necessary as food, under various conditions.

Conclusions from Experiments.

Prof. W. S. Johnson, in his report of the Connecticut Agriculture Station for 1877, gives the following translations from Dr. Wolff, a German experimenter. These, of course, must only be considered as approximative. They, however, will show as being the result of practical experiment—principles upon which ratios may be made up of other material.

Dr. Wolff, in illustrating the standard for a milch cow, says that 30 lbs. of young clover hay will keep a cow in good milk; that this contains of dry organic substance 23 lbs., of which is digestible—albuminoids 3.21, carbo-hydrates 11.28, and fat 0.63. This is 71 lbs. albuminoids more, and .22 lbs. of carbo-hydrates less, with .13 lbs. of fat more, than the standard. The richest and best meadow hay contains in 30 lbs., of organic substance 23.2 lbs., having digestible albuminoids 2.49 lbs., carbo-hydrates 12.75 lbs. and fat .42 lbs. This comes very near the feeding standards.

Feeding Standards.

PER DAY, AND PER 1,000 LBS. LIVE WEIGHT.

	Total Organic Dry Substance.	Nutritive Digestible Substances.			Total Nutritive Substances.	Nutritive Ration
		Albuminoids.	Carbohydrates.	Fat.		
1. Oxen at rest in stall	17.5 lbs.	0.7 lbs	8.0 lb	0.15 lb	8.85 lbs	1:12 lbs.
2. " moderately worked	24.0 "	1.6 "	11.3 "	0.30 "	13.20 "	2:7.5 "
3. " heavily worked	26.0 "	2.4 "	13.2 "	0.50 "	16.10 "	1:6.0 "
4. " fattening, first period	27.0 "	2.5 "	15.0 "	0.50 "	18.00 "	1:6.5 "
" " second period	26.0 "	3.0 "	14.8 "	0.70 "	18.50 "	1:5.5 "
" " third period	25.6 "	2.7 "	14.3 "	0.60 "	18.00 "	1:6.0 "
5. Cows in milk	24.0 "	2.5 "	12.5 "	0.40 "	15.40 "	1:5.5 "
6. Growing Cattle:						
AGE—MONTHS. AVE. LIVE WT. PER HEAD						
2— 3 150 pounds	22.0 "	4.0 "	13.8 "	2.0 "	19.8 "	1:4.7 "
3— 6 300 "	23.4 "	3.2 "	13.5 "	1.0 "	17.7 "	1:5.0 "
6—12 500 "	24.0 "	2.5 "	13.5 "	0.6 "	16.6 "	1:6.0 "
12—18 700 "	24.0 "	2.0 "	13.0 "	0.4 "	15.4 "	1:7.0 "
18—24 850 "	24.0 "	1.6 "	12.0 "	0.3 "	13.9 "	1:8.0 "
PER DAY AND PER HEAD.						
2— 3 150 "	3.3 "	0.6 "	2.1 "	0.30 "	3.00 "	1:4.7 "
3— 6 300 "	7.0 "	1.0 "	4.1 "	0.30 "	5.40 "	1:5.0 "
6—12 500 "	12.0 "	1.3 "	6.8 "	0.30 "	8.40 "	1:6.0 "
12—18 700 "	16.8 "	1.4 "	9 1 "	0.28 "	10.78 "	1:7.0 "
18—24 850 "	20.4 "	1.4 "	19.3 "	0.26 "	11.96 "	1:8.0 "

To show how a ration for milk cows may be arranged of various material, he gives the following:

Ration for Milch Cows.

	Dry Organic Substance.	Digestible.		
		Albuminoids.	Carbohydrates.	Fat.
	lbs.	lbs.	lbs.	lbs.
12 pounds average meadow hay	9.5	0.65	4.92	0.12
6 " oat straw	4.9	0.08	2.40	0.04
20 " mangolds	2.2	0.22	2.00	0.02
25 " brewers' grains	5.6	0.98	2.70	0.20
2 " cotton-seed cake	1.6	0.62	0.36	0.24
	23.8	2.55	12 38	0.62
Standard	24.0	2.50	12 50	0.40

Prof. Johnson gives the following rations, calculated from the table:

20 pounds cured corn-fodder	13.7	0.64	8.68	0.20
5 " rye straw	4.1	0.04	1.82	0.02
6 " malt sprouts	5.0	1.16	2.70	0.10
2 " cotton-seed meal	1.6	0.62	0.36	0.24
	24.4	2.46	13.56	0.56
Standard	24.0	2.50	I2.50	0.40

Or, again:

	Dry Organic Substance.	Digestible.		
		Albuminoids.	Cardo-hydrates.	Fat.
15 pounds corn-fodder	12.1	0.16	5.55	0.04
5 " bran	4.1	0 59	2.21	0 15
5 " malt sprouts	4.1	0.97	2.25	0.08
3 " corn-meal	2.5	0.22	2.05	0.07
2 " cotton-seed meal	1.6	0.62	0.36	0.24
	24.4	2.56	12.42	0.58

A correspondent of the *National Live Stock Journal* gives the following as a practical ration which he used to feed forty steers, weighing an average of 900 lbs., and gaining 2 1-2 lbs., per head, per day:

12 pounds oat straw	9.80	0.17	4.81	0.08
5 " hay	3.98	0.27	2.05	0.05
6 " corn-meal	5.04	0.50	3.64	0.28
4 " bran	3.22	0.50	1.70	0.10
2 " Linseed meal	1.61	0 47	0.70	0.18
	23.65	1.91	12.90	0.69
Standard for fattening cattle of this weight	24.30	2.25	13.50	0.45

This corresponds quite closely with the German standard. The albuminoids are slightly less, and the fat more. One gallon of cheap molasses added to the rations of hay for forty head, would nearly bring up the carbo-hydrates to the standard. Again he says: The following is a practical ration fed to 10 steers for 90 days; their average weight for the 90 days being 1,348 lbs.; and this was the average ration fed—the average gain being 3 lbs. per head, per day:

15 pounds oat straw	12.25	0.21	6.01	0.10
6 " hay	4.77	0.32	2.46	0.06
7 " corn-meal	5 86	0.59	4.24	0.33
3 " pea-meal	2.48	0.51	1.32	0.05
3 " oat-meal	2.48	0.29	1.29	0.14
1 " flax-seed	0.86	0.17	0.18	0.29
	28.70	2.09	15.50	0.97
Standard for fattening cattle of this weight —3d period	33.70	3.63	19.95	0.80

This seems a wide departure from the German standard; but that all the conditions may be understood, it is stated that the corn, pease, oats and flax-seed, in the proportions stated, were mixed and ground together, and then 14 lbs. of the mixed meal was mixed with the 15 lbs. of oat straw, cut into inch lengths, and all well cooked together; that is, 420 lbs. of the ground meal was mixed with 450 lbs. of cut oat straw, placed in a steam-box and well cooked with steam, and this served for three

days' rations for the 10 head, except that 6 lbs. of long hay was given to each at noon. Perhaps the explanation is, that the cooking rendered a so much larger per centage digestible, that it was, in effect, equal to the German standard. These steers weighed 1,210 lbs. when the experiment began, and 1,485 lbs. at the end of 90 days; so that 1,348 lbs. was the average weight during the period. The meal ration was but 10 lbs. during the first two weeks, and increased gradually up to 16 lbs., at the end of 60 days; making the average ration 14 lbs. per day.

As supplementary to this we give three rations applicable to the East, South and West, in the order named:

CLOVER AND CORN RATION FOR FATTENING CATTLE OF 1200 LBS.

	Dry Organic Substance.	Digestible.		
		Albuminoids.	Carbohydrates.	Fat.
	lbs.	lbs.	lbs.	lbs.
20 pounds best clover hay	15.20	2.14	7.52	0.42
5 " straw or cornstalks	4.10	0.04	1.82	0.02
15 " corn-meal	11.77	1.17	8.48	0.50
	31.07	3.35	17.82	0.96
Standard for fattening cattle of 1200 lbs., 2d period	31.20	3.60	17.70	0.84
OF PEAS AND OATS, DRIED IN BLOSSOM, WITH CORN-MEAL.				
27 pounds pea and oat hay	20.60	2.16	9.61	0.48
12 " corn-meal	10.09	1.00	7.27	0.57
	30.69	3.16	17.88	1.05
WINTER RATION OF WESTERN CATTLE, CORN AND STALKS.				
20 pounds dry cornstalks	16.52	0.16	7.30	0.08
20 " ear-corn	16.82	0 68	12.12	0.96
	33.14	1.84	19.42	1.04

It will be of interest now to show the chemical composition, digestibility and money value, according to the German standard, for 2,000 lbs. of clover hay, meadow hay, corn fodder, oat straw, oil cake, wheat bran, corn meal and oats. These foods, used more in the United States than any like number of others, are also complementary to each other: (See table on following page).

Comparing Values.

The comparisons of values by the ton of these very dissimilar foods is as follows: We find clover hay worth $17.82 and oat straw $9 per ton; but it cannot be inferred that oat straw would be as cheap at that price as clover hay to make an entire food for cattle, or other animals, because clover hay is a well balanced food for cattle and oat straw is only a

RELATIVE VALUE OF DIFFERENT KINDS OF FOOD.

	In 100 pounds.	Digestible.	In 2,000 lbs.	Money Value.
CLOVER HAY.			lbs.	
Albuminoids	15.3	10.7	214	$9 24
Carbo-hydrates	35.8			
Crude fibre	23.2	37.6	752	6 76
Fat	3.2	2.1	42	1 82
			1008	$17 82
AVERAGE MEADOW HAY.				
Albuminoids	9.7	5.4	180	$4 68
Carbo-hydrates	41.6			
Crude fibre	21.9	40.1	820	7 38
Fat	2.5	1.0	20	87
			918	$12 93
CORN FODDER.				
Albuminoids	4.4	3.2	66	$2 86
Carbo-hydrates	37.9			
Crude fibre	25.0	43.4	868	7 81
Fat	1.3	1.0	20	87
			954	$11 54
OAT STRAW.				
Albuminoids	4.0	1.4	28	$1 21
Carbo-hydrates	36.2			
Crude fibre	39.5	39.5	802	7 21
Fat	2.0	0.7	14	61
			844	$9 61
OIL CAKE.				
Albuminoids	28.3	23.77	475	$19 00
Carbo-hydrates	32.3			
Fibre	10.0	35.15	703	6 32
Fat	10.0	9.0	180	61
			1358	$33 12
WHEAT BRAN.				
Albuminoids	15.0	12.6	252	$10 92
Carbo-hydrates	52.2			
Fibre	10.1	42.6	852	7 67
Fat	3.2	2.6	52	2 25
			1156	$20 84
CORN MEAL.				
Albuminoids	10.0	8.4	168	$7 28
Carbo-hydrates	62.1			
Crude fibre	5.5	60.6	1212	10 90
Fat	6.5	4.8	96	4 16
			1476	$22 34
OATS.				
Albuminoids	12.2	9.0	180	$7 80
Carbo-hydrates	55.0			
Crude fibre	9.3	43.0	860	7 74
Fat	6.5	4.7	94	4 07
			1134	$19 81

partial food, containing so little albuminoids and fat that cattle would starve to death upon it if fed long enough. The muscles and nerves could not be nourished upon it; and yet a good article of oat straw is worth the price named, because of the digestible heat and fat formers it contains. Now, put a ton of the best oat straw with a ton of the best clover hay, and you have a fairly balanced food. It compares well with common meadow hay. The digestible albuminoids in clover 10.7, in straw 1.4, making the two added 12.1, and the average per cent of the mixture is 6.05, whilst meadow hay is only 5.04. The digestible carbohydrates in the mixture is about 39.0 to 41.0 in hay, and the fat is 1.4 to 1.0 in meadow hay. The parallel is very close; and as the mixture has slightly more albuminoids and fat, it may be considered the better ration. These valuations of the different elements simply mean that each is worth the relative price named when fed in due proportion with the other elements. Oil-cake, for example, is as far from being a balanced ration as oat straw, for it contains as much too large a proportion of albuminoids as straw does too small. It has also oil in excess. Like straw it must be fed with other foods. If 400 lbs. of oil-cake be mixed with a ton of oat straw, the mixture will make a ration equal to meadow hay.

Feeding Where Corn is Cheap.

When stock of any kind is kept and fattened in stables, on ground or cooked food, these tables will be found valuable. So far as our own experience goes we have found that for growing animals there is nothing better than equal weights of corn and oats, or corn and barley, with what good hay or shocked corn fodder they will eat. We have also found that when corn was less than 30 cents per bushel it did not pay for grinding even for cattle, if it could be fed in the ear or in the husk, the experiments being based on the toll taken, and the cost of hauling ten miles to mill. For sheep, horses, and hogs it will not pay for grinding when it is less in price than 40 cents per bushel.

In all that great scope of country in the West known as the corn zone, the most economical manner we have ever found in fattening cattle was to feed, first, shock-corn; next, snapped corn; and, third, husked corn in the ear. In feeding the two latter, the animal weighing 1,000 pounds should have about 25 pounds of corn and 10 pounds of best hay.

In feeding shock corn the animal will eat no more than it requires, and it should have twice a day whatever it will eat up clean, of ears. In feeding in this manner in the fields or dry yards with abundance of water, allowing hogs to run after the cattle after they have finished the ears, to pick up wasted corn and droppings—if the cattle are sheltered from wind and storm, they may be most economically fed and to very heavy weights

Raising Young Cattle.

Here again the breeder must be guided by sound judgment. It will not pay to starve even the commonest stock. A calf, to use a common expression, "knocked in the head with a pail of skimmed milk," will never make a first class steer or cow. Neither is it necessary that they suck the cow. In fact, in the case of dairy cows or heifers intended for the dairy, they should not suck, for it surely tends to diminish the flow of milk, except the calf is turned with the cow at stated intervals, and the cow milked clean at the same time. In the case of heifers, they should be milked as soon as the calf has drawn the first milk, both as a means of training and to develop the flow of milk as much as possible; besides this, a calf taken at two or three days old is easily taught to suck the finger or an artificial teat attached to a reservoir.

The First Two Weeks,

They should have nothing but new milk. It should be as warm as it comes from the cow, and the calf should be fed four times a day. Then they may have milk twelve hours old, from which the cream has been taken, adding four ounces of finely ground meal made into thoroughly cooked mush, to each meal, for strong, hearty calves. Thus they may be fed for two weeks more, changing to oat-meal or wheat flour if the calf is inclined to scour. Some feeders add a teaspoonful of linseed meal once a day. It is not a bad plan. When the calf is four weeks old it need be fed but twice a day, giving milk warmed to about ninety or ninety-five degrees, which last is the natural animal heat. From this time on more and more mush, or its equivalent may be added as the calf increases in size and strength, until it begins to eat grass and threshed oats, which it should be encouraged to do.

Feed Early.

At ten weeks old it should eat freely, and at three months old it may be gradually weaned from milk and taught to subsist on grass and oats. During all this time the calf should be sheltered from the hot sun and rain, by providing a shelter to which it may retire, well ventilated, dry and clean, and sufficiently dark to keep out green-head and other biting flies. In the autumn its rations of grain should be increased, and as grass fails the finest meadow hay should be substituted—whatever it will eat clean of both. Offer it water occasionally after it is a month old, and when weaned see that it never lacks for water.

Figuring Profits.

During the winter keep the calves in the warmest quarters possible; feed liberally with grain and hay, and in the spring you will have the satisfaction of knowing that you have received the best profit that you will ever reap from the animal at any subsequent age; but upon comparing debit and credit with your neighbor who has fed skim-milk alone in summer and poor hay in winter, you will find that the loss on his calves has gone in the shape of profit in yours.

From this time on feed liberally of grain in the winter, and give a little all summer when they will eat it. Let them in winter be so warm that they never become chilled. So continue until the animal is within six months of being ripe for the butcher. Then feed the best you can, and you will be rejoiced to find that you may get two to three cents a pound gross weight more than your neighbor who has only half fed and has turned off his cattle totally unripe for the butcher.

The same rule will hold good for those calves intended for cows. To make a good cow, she must be fed well to bring early development and maturity. She may thus be brought forward strong and lusty, and in better condition at two years past to bring you a perfect calf, than those of your neighbor at twice that age, whose policy has been to grudge them feed and allow them to shift for themselves.

Castration.

When the bull calves are three weeks old, if in good health, they should be castrated. It should certainly be done before they are four weeks old. Many of our best stock raisers incline to the opinion that as soon as the calf begins fairly to gain size and flesh, say at two weeks old, is the proper time. We have never had better success than at this time. Every person who purposes to breed cattle should know how to do this. The operation is quite simple, and easily performed.

Secure the calf so it may remain standing on its feet, but cannot struggle severely. Have a knife ready with a keen-edged blade. The blade of a budding-knife is the proper shape. Seize the scrotum from behind, and with two light, swift, sharp strokes cut through and into the testicle. Separate the membrane where it unites, pull the testicle out until the cord shows from four to six inches, and cut it with a pair of nippers or rather dull shears. It will save loss of blood. So operate with the other, and the work is done. If from any cause severe bleeding ensues, inject a little tincture of muriate of iron into the cavities, and wet a soft rag with the tincture and press it well into the cavity. If these be not at hand, push a little salt and lard into the cavity. If the operation has been care-

fully performed, nothing will generally be required. The calf should be kept free from interference by other animals

Until the Parts are Healed,

which will usually occur in a week. If they have been used to the company of other calves, they should not be deprived of it now, else they will pine. One reason why we advise early gelding, is, it should be done before the calf is taken off of new milk, and it should not be deprived of the natural milk until it recovers from the shock. Care must be taken that flies do not get near, to deposit their eggs in the parts operated on. To prevent this, if there are flies, keep the calves in a pretty dark, but well ventilated place. Most persons will find it awkward at first to geld as we have directed. A little practice, however, with tact and firmness, will render all easy, especially if one can have the advantage of seeing an expert operate once.

Sometimes Suppuration Ensues.

In this case recourse must be had to mild palliative measures. Keep the parts washed clean, twice a day, with warm rainwater and castile soap, and inject a small quantity of tincture of aloes and myrrh. If the parts become unhealthy, or ulcerated (for mere suppuration is healthy action), wash with a weak and clear solution of sal soda, or hard wood ashes. If proud flesh should arise (a rare occurrence), burnt alum, pounded very fine may be applied, or the parts may be touched with lunar caustic.

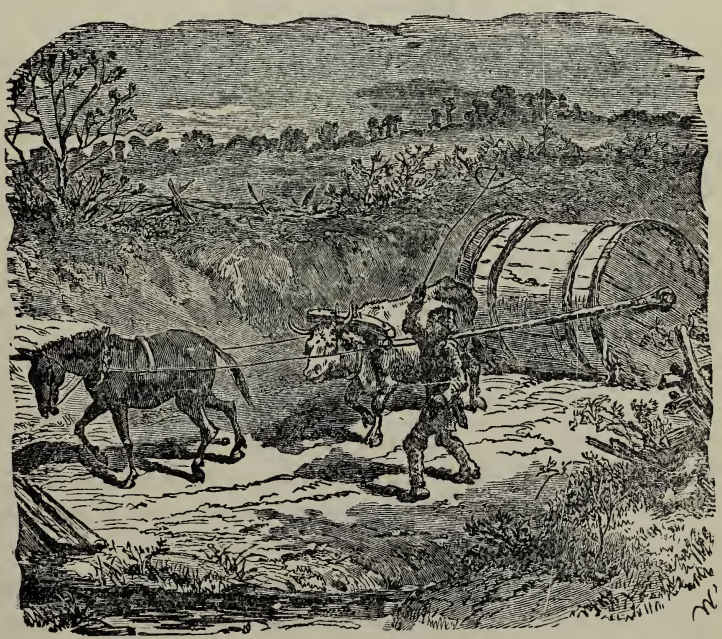
CHAPTER III.

TRAINING AND WORKING.

TRAINING VS. BREAKING——TRAINING THE CALF——HALTERING——TRAINING TO MILK——FEEDING AT MILKING TIME——VICIOUSNESS IN COWS——HOOKING COWS——TRAINING OXEN——TRAIN STOCK YOUNG——SUMMING UP——MANAGING A KICKING COW.

Training Cattle vs. Breaking.

The word "breaking" horses or steers to work, or breaking a heifer in to milk, has now-a-days become pretty well obsolete. Breaking by brute force may make a kind of a machine of an animal; it may do stupidly



WORKING BY MAIN FORCE.

what is desired, and yet not do it to the best advantage. Intelligent persons now do not break an animal by destroying its will, they simply make it subservient to that of man, by letting it know at the first hampering for training that it will not be hurt, if it does not resist. All domestic animals are naturally subservient to the will of man; they require to be taught what is wanted, and the individual should know that no good can come out of any system of training which compels the use of the whip constantly. The whip is necessary only as a means of correction, when an animal is refractory after understanding the will of the master. An intelligent trainer will easily distinguish between stubborn antagonism and a want of comprehension. We have never seen young animals stubborn, except that they did not understand what was wanted of them; and in animals that have at length been made to work in the yoke, or to stand quietly to be milked, but which have "freaks," as they are called when they seem wild or stubborn, it is usually the result of bad treatment in "breaking," and the animal is actuated almost solely by fear. If, in the struggle which ensues, the animal becomes master, it is thereafter of but little use. It is better in training that the struggle be not made necessary.

Training the Calf.

If the calf has been raised by hand, that is, fed with milk from the pail, it will, or should have, become so gentle and familiar as to allow itself to be approached readily, and to respond to the call of its master. Many persons at this time name every calf, and thus they soon come to know their names when called. If firmness and at the same time gentleness have been used, so that the calf will understand that there is nothing to fear; if no struggle is made, it is well on the way to understand what is further expected of it. It should be rubbed and curried occasionally, especially on those parts of the body that itself cannot reach, as the head, neck and shoulders; or, if kept in the stable constantly, it should be brushed all over at least once a day. Here is one of the first and most important lessons. At first, the calf does not know what is intended. If the master gets angry and beats it, it will ever after associate currying and brushing with a beating; and when it gets older and stronger, in the constant successions of struggles to escape punishment, it will at length find it is the stronger animal of the two. Thereafter itself and not the man is master. The object of currying is not to give pain. It is an operation of cleaning that the animal cannot perform for itself, because confined in a stable. If the animal is turned out during

the day, and confined only at night; or if it have the range of the yard and sheds day and night, the cleaning is not needed. Animals can and do perform these offices for themselves and for each other by licking, so far as is necessary. The accumulating scurf in an out-door life is a provision of nature for the protection of the animal. It should not be touched. In the stable, however, it is different. The lack of exercise tends to a sluggish movement of the blood, and hence a clean skin becomes one of the most active integers in preserving the health of the animal. In using the comb or brush, or, in the case of cattle, the card and brush, a light hand with the comb and card will do better work than a heavy hand. It should be unnecessary to say that about the bony parts the card or curry-comb should never be used.

Haltering.

The first thing a calf should be taught is to stand quietly when tied, and under all circumstances. If it is taught this by being tied up immediately upon being taken from the cow to be fed milk, or at from three days to a week old, there will be no difficulty. If the calf has run with the cow, it will be strong and lusty. In this case, the lot if they are to be stabled, should be put into a close pen, and a strong halter fastened to the head, of one of them, using discretion and time so as not to frighten the animal. Once secured, two men will easily place it in position in the stable. So proceed until all are handled. Here they may be gently handled until quieted, whatsoever the manipulation.

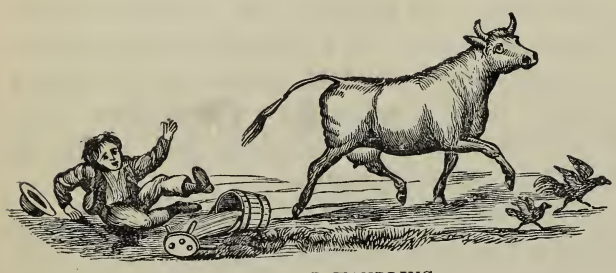
The next step will be teaching it to lead. Take it into a closely fenced yard, having the calf haltered at the end of a ten-foot rope; stand in front of it and utter the word "come." Of course, it will not move. Utter the word again, and at the same time let an assistant tap it lightly with a buggy whip on the legs, from behind, or hold the whip yourself and tap it on the forelegs at the utterance of the word. The animal will soon understand what is wanted and come forward. It should then have something it likes, the least possible lick of salt, for instance. From this time on you will have no difficulty in teaching the calf to follow quietly; in fact it may be taught to do many things: to back or come forward at the order; to turn to the right or left. In fact, it should be half broken to milk before it has had a calf, or should be half broken to labor before the yoke is put on.

To illustrate the difference between this plan of uniting firmness with gentleness in the training of cattle, one has only to observe the difference in cattle on different farms. The stock of the brutal farmer will never willingly allow the owner to come near them. If a master's animal be in

a corner and he approaches, there is a dash to escape, and perhaps some young animal is maimed. Such stock soon acquire the habits of their master: they are morose, ugly, often vicious; for in a herd under bad management animals sometimes get the better of the master, and are apt to become breachy, tricky, and generally unmanageable.

Training to Milk.

In training to stand quietly while being milked, the udder should be often handled while the heifer is growing up; the bag should be rubbed; it should be pressed and the teats gently pulled. This need take but very little time. The real work comes when the animal is to be milked. There are many things to be taken into consideration here. The heifer must be put in a pen where she cannot hurt herself, and where the milker can operate easily; a pen just long enough and just wide enough for the heifer to stand in, five feet high and tight enough so there will be no danger of the heifer injuring herself, and with an opening for the milker to operate through, will thoroughly subdue the wildest. Generally, all that is needed will be to tie the heifer by the head, and then patiently show her that she will not be hurt. She will soon come to associate the act of milking as easing the udder and thenceforward will stand quietly, unless the bag or teats hurt her. If so, seek the cause of the difficulty and cure it.

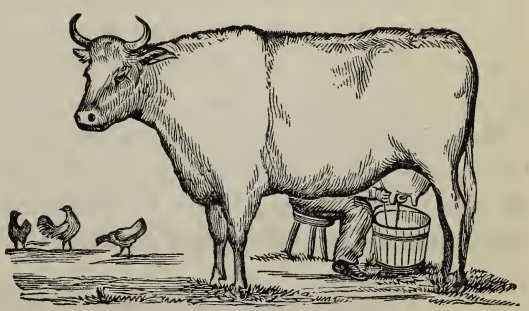


RESULT OF BAD HANDLING.

If the animal has never been tied up, but has been handled in the yard, one person may take the heifer by the horns, while another milks. If she be very refractory she may have to be "nosed." Seize the off horn firmly with the right hand, and thrust the two first fingers and thumb of the left hand into the nostrils, clasping the membrane tightly if she struggles severely. So soon as the struggles cease, ease the pressure of the fingers in the nostrils. If she again struggles, again tighten the grasp. Let the milker use gentleness. It does no good to kick an animal; it may do much harm. If the heifer kick, it is probably because she is hurt. A person of ordinary strength need not be kicked while milking, unless in the case of a cow of extraordinary strength and viciousness. The wrist of the left hand holding the teat, if kept well against the stifle, and pressed firmly back when the foot is raised, will

generally cause it to be set down in place again. Use soothing words when the animal is quiet, and low but firm words of command when refractory. If the udder is inflamed, as is very often the case soon after calving, bathe it carefully with cold water, so as not to shock the animal. She will soon come to associate a feeling of relief with the operation and like it. In fact, the whole art of training may be summed up in the sentence: *Use discretion and judgment, and show yourself superior to the brute—in truth, its friendly master.* The conquering of brute force by brute force is a relic of barbarism. There are vicious animals as there are vicious men; there are dangerous animals as there are dangerous men. Both may have been bred or educated thus. Vicious men are placed where they cannot injure their fellows; vicious animals had better go to the butcher—they are as unprofitable to breed from as they are useless for what may be got out of them.

As showing the effects of bad and good handling, we give the picture of a cow made wild and vicious by bad handling, and that of a cow used to kind treatment and gentle but firm handling. The reader can draw his own conclusions as to which is the best system.



RESULT OF GOOD HANDLING.

Feeding at Milking Time.

Some persons, to induce gentleness, give the cow a mess before sitting down to milk. This is a bad plan. It leads the animal to expect it, and if it is not given, even if she is gentle, she is restless and discontented. The very act of feeding induces moving about more or less, and prevents standing as quietly as she otherwise would. On the other hand, if she be fed after milking time she will stand quietly and entirely at ease. Many good handlers feed before milking. By the time the whole are fed and the stable cleansed the cows will have finished and be ready for milking. This is the plan we have always pursued, and we think the better one: Before sitting down to milk we have been accustomed to have the milker give the cow to be milked the slightest lick of salt from the hand, or a single mouthful of extra nice soft hay. When you begin milking do not intermit until the cow is milked entirely clean. Milk fast. Slow milking not only worries the cow but tends to dry her

up. If the milk is not drawn as fast as it is given down it is apt in the end to be withheld.

How to Milk.

Supposing the cows to be in the stable, after feeding, and cleaning the stable and the animals themselves, carefully wash the udder and teats, if they are dirty, or thoroughly brush with a soft brush, or wipe with a cloth if only dusty. Sit down quietly on the off or right side of the cow, the face slightly to the rear; take hold of the rear teat furthest from you with the left hand, and speaking the word "hoist," slowly and in a low but firm tone, press the arm against the leg, to carry the foot in place slightly behind the other. In milking, grasp the upper portion of the forward teat nearest you, so the hands operate the teats diagonally. In grasping the teats, do so well up towards the bag, according to the length of the teats, with the thumb and forefinger, and pulling gently down, at the same time, close the other fingers, thus forcing out the milk. So proceed, first with one hand and then with the other, until the milk is pretty much drawn. Then change to the other teats and finish them.

In stripping do not use the thumb and finger, pulling the teat from the root to the end. It is a senseless plan. Every drop can be had by pressing the top of the hand well up under the bag, gathering the milk with the thumb and forefinger, and drawing the milk with the others.

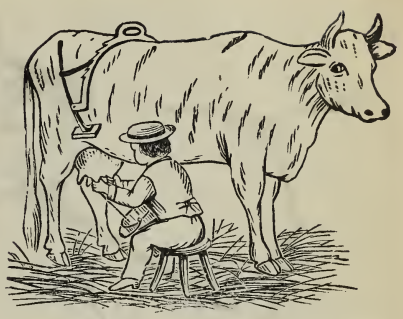
Viciousness in Cows.

Sometimes a person will have a cow that is given to viciousness from bad training, and which may be so valuable in other respects that the owner may not wish to part with her. She may be a kicker. If so, and she be strong and decidedly ugly, use the following apparatus, which will explain itself, and which, by the lever and notches, may be made to grip tightly into the flank. Another plan is to draw a strong cord quite tightly around the girth. The most usual plan, in the stable, is to buckle a strap around the legs and to fasten it to a ring in the wall behind, so the cord will be loose when at rest, and yet so tight that the cow cannot get her leg forward to do mischief. The cut we give will show the first device mentioned and the manner of fastening:

Cows Sucking Themselves.

Sucking themselves is another bad habit which cows sometimes acquire. There are two objections to such cows. The first is, we lose their milk, and not rarely other cows will acquire the habit from them. It is a well

known fact that self-sucking cows are generally good milkers. It is quite certain that they acquire the habit from the fact that the milk pressure in the bag hurts them, and in rubbing the udder with the nose they at length get a taste of the milk, and thus become fixed in the habit. Hence the necessity of regular milking, and often enough to keep the udder from being unduly strained. There are various devices for preventing this vice. One is a halter and nose piece, with spikes, similar but larger than those used upon calves to prevent sucking. It is given below, but besides hampering the animal to a considerable extent in gathering her food, it is not always effectual.



TO PREVENT A COW FROM KICKING.

A very simple, and said to be effective means, is to take a tough hickory stick, fourteen inches long, three-fourths of an inch thick in the center, sharpened to a point at each end; cut a grove around the center, half an inch wide, and half the depth of the thickness of the wood. Whittle each end nicely to a point, or leave it somewhat blunt, and insert a sharpened piece of wire in each end. Make a hole in the animal's nose, in the soft portion, but close up to the hard membrane of the nostrils, as you would for ringing a bull, and small enough so it will require considerable pressure to slip the bulge of the stick until it reaches the middle notch, when it will remain fixed. This does not prevent the animal from feeding, nor being fastened in stanchions, and it must be an inveterate sucker that will draw her milk with this jewel in her nose. Still another but more complicated yet quite effectual plan is given in the cut on next page.

TO PREVENT SUCKING.

Hooking Cows.

Another vicious habit sometimes acquired by otherwise excellent cows, is the vice of attempting to gore every animal that comes near, that they can master, and even individuals. Various devices have been recommended to prevent this. One is a bar across the horns, to which is

HARNESS TO PREVENT SUCKING.

fastened a slender, springy piece of hickory to reach a position just above the nostrils and armed with a sharp peg underneath, so that the slightest pressure will cause it to wound the nose. In a majority of cases balls placed on the tips of the horns, and which may be purchased at any hardware store, will suffice, if the animal is not vicious to mankind.

These are made to screw on. To do so fasten the cow securely, and if the horn is too large to take the ball pare it down till it will fit. Stick a large potato baked soft, and thoroughly hot, on each tip of the horn. It will soon soften it, when the ball may be easily screwed on with the proper tool, and will never come off. In the case of animals vicious to man, the following device, which the cut fully explains, will prove entirely effectual.

Training Oxen.

TO PREVENT HOOKING.

The value of a working ox lies not only in its ability to draw a heavy load forward; to be thoroughly good in mud, or on roads; to be able to back whatever he can draw forward, and to be quick-paced. It is true you cannot make a slow breed fast, nor a lazy ox active; neither can you make an ox that lacks muscle do heavy work. If the reader has studied the characteristics of the Devons as we have presented them, he will be pretty well able to judge whether an animal under inspection will be fit for the yoke. If not fairly perfect in the principal points, discard him. It will not pay to train an inferior steer. If he is to be used for very heavy work, agility must to a considerable degree be sacrificed to weight and muscular power. As a rule, however, it is better that you use three

yoke of medium sized active steers in the team rather than two yoke of heavy, lubberly, snail-paced brutes that are always vexing the driver.

Select such as will walk evenly, look as nearly alike as possible so that they may be hitched together: first, for disposition, carriage, and pace; and second, for color and general appearance. If they are three years old, and to be put to work immediately in a breaking or freighting team, select a pair of mates, hamper by first roping and tying, and then yoking together. So proceed until you have the team, whatever the number, made up Once yoked, they should not again be released until they cease struggling, and work quietly in the team. Fasten them together, three, four, or five yoke, as the case may be, putting a well broken steady yoke of oxen on the lead. Thus you may have a team in a few days that will learn to pull steadily forward and turn "haw" or "gee"

A PRIMITIVE TACKLE, BUT GOOD TRAINER.

—to the left or right—as is wanted. They, however, will never become a team, in the sense of the word, as used by those who know what a trained yoke of oxen are.

To properly train steers, they should be taken when quite young. Selecting one at a time, halter-break him as heretofore directed, cause him to come close to you by tapping him on the forelegs with a light whip. Teach him to walk quietly, but at a quick pace, at your side, you holding him lightly by the halter, neither before nor behind, but directly and closely at your side. Make him turn to the right or left at will, and teach him to stand quietly when so ordered. In all this do not hurry. Be quiet, low-voiced, patient but firm. Angry demonstrations and outcries may produce some spasmodic results, but the real, patient, working force of the animal will not be brought into effective operation by any such means.

Train Stock Young.

Let the steer, which should not exceed one year old—eight months is better—be taught one lesson at a time, and that thoroughly. It will render the next lesson easier. When they are quiet and will do your bidding in the yoke without halter or strap, they may be left until three years old before being worked, though it is better to begin at two years of age, especially if they are to be used on the wagon. They will not pull much, but they may thus be taught to walk fast, to do their share of the work, and to become thoroughly "way wise."

The greatest difficulty in training oxen, as a single yoke, is teaching them to back promptly and well. To do this requires patience. Never overload them. Make them back promptly twelve to fifteen feet at a time, and then come forward, stopping instantly at the word, with heads up ready to back again. In traveling along the road never allow them to flag, nor exert them so long at any one time as to seriously weary them. Patience alone will secure the end sought. When you have occasion to speak sharply to them, do not let it be in a very loud voice, but let it be accompanied by a touch of the goad or a blow of the whip sufficiently sharp so the animals feel it. To touch both animals so near together that it seems almost simultaneous, is a fine art. It is acquired by always touching the slow ox first, for scarcely ever will two animals be found so evenly matched as to be exactly alike. When you find them you have a prize. When not so, we have always found it best to have the slower ox on the near side.

Summing Up.

In summing up the whole matter of training, the individual must keep the points aimed at steadily in view. First, the animal must be rendered entirely subservient to man, and this by showing it that man is its friend; that under no circumstances is it to be injured. A well trained yoke or a team of oxen will command a fancy price as easily as a well trained span of horses. There will be, for many years to come, uses to which neither horses nor mules are so well adapted as are oxen. In lumbering, especially in breaking prairies, in much of the work of the farm, and for teaming in wild regions generally, where there is nothing but rank, wild grassy feed, they will be indispensable. In these cases the trained team will do one-third more work than the untrained team, and do it easier for themselves, and much more satisfactory to the driver. Here again the driver should be himself trained. A brutal driver will soon ruin a good team, yet cannot entirely destroy their value.

An intelligent driver will accomplish what he wants without undue severity; his voice and signs are the potent powers. In starting a heavy load each ox is called by name, however large the team be. They understand that they are to place themselves in position for action; every chain is straightened, every muscle is brought into tension; they get well into the yokes, and at the signal all start together. With such a team the load must come.

So with cows. The training of the heifer is begun in calfhood: she learns to rely entirely upon the master. They know his voice either in the yard or field, and come clustering about him, expecting some "tid-bit," or at least a kindly word or caress. When the first calf is dropped there is no fear of the master; he may take it and do with it what he will—only fond solicitude is shown. Let a stranger come about, and instantly this solicitude is changed to fear. If a person who has beaten them or otherwise ill-used them approaches, the fear is intensified, and if he offers to handle the calf, a battle for the mastery is likely to ensue.

We have never had any trouble in teaching a heifer to stand to be milked. If the udder is tender, as in nine cases out of ten it will be, they will gently submit to the means used for relief and seem grateful for the effort. If strange heifers are to be operated on, the first thing to teach them is, that you are a friend; whatever the time it takes, whether half an hour or half a day, do not intermit the effort until the animal is subdued. If refractory it is better that the heifer or cow be tied up at once and kept there until entirely quiet and without fear. Then fully half the work is done and the subsequent work is only a question of time and of patience.

Managing a Kicking Cow.

We once subdued an unusually refractory and kicking cow, by having her held firmly by the head while we seized the teats firmly one with each hand. There was no attempt to milk. The lesson to be given was that she could do no injury by kicking. It took three-quarters of an hour to accomplish the object. When she kicked the grasp was tightened; the wrist was brought back firmly against the leg above the hock. When she ceased kicking the grasp was relaxed, and the motion of milking was performed so far as pulling gently on the teats when she kicked, or rather attempted to do so by bringing her foot forward. She soon found it was invariably brought down again nearly in its proper position in the rear of its mate. In the end she gave up and submitted to be milked. One new lesson she had to learn, to stand without holding. This was accomplished by following her about until she was content to stand, which she

did after three or four breaks. Within a week, there was no more quiet cow in the yard than this heretofore incorrigible vixen.

A Happy Family.

As showing the benefits of superior care and training, it can be demonstrated how nicely all farm stock will get along together in peace, when owned by a small farmer who cannot afford to separate into distinct herds on account of scarcity of numbers. If raised together in the same yard each will find its proper level. They will agree kindly in a small pasture, and if the pigs are ringed there will be no difficulty about rooting up the soil; and of the different classes of animals each will eat grasses and plants not relished by the others. The fact well illustrates the adage, "A merciful man is merciful to his beast."

CHAPTER IV.

HOW TO SHELTER.

Necessity of Shelter.

NECESSITY OF SHELTER —— ARTIFICIAL PROTECTION —— A FRAMED STABLE —— A CHEAP STABLE —— ABOUT BARNS —— A COMMON SENSE BARN —— A SQUARE CROSS BARN —— BASEMENTS FOR CATTLE —— ARRANGING THE BASEMENT —— ADAPTING MEANS TO THE END —— WHAT TO PLANT.

In all climates where cattle have to be fed nearly half the year, the question of shelter becomes of the first importance. In the middle corn region of the West, cattle must be fed from four to five months; and farther north, from five to six months. If the pasture in October be only sufficient to supply the animal waste, then such feeding is entirely lost so far as profit is concerned. The object of keeping cattle is to get growth and weight. The extra food given over and above the natural waste, represents the profit. Hence in the artificial feeding of cattle the question of shelter comes in. A cold storm will often seriously reduce the weight of stock. They will begin to fall away, and before they get ready to again increase in weight they will have had a season either longer or shorter when they will perhaps neither have gained or lost. The natural heat of the animal must be kept to about 100 degrees. In fact, the natural heat is 96 degrees whatever the temperature of the air. If it falls below this the animal begins to chill, and the body is called on to furnish additional heat. So long as this can be supplied the animal lives. When it is exhausted the animal dies.

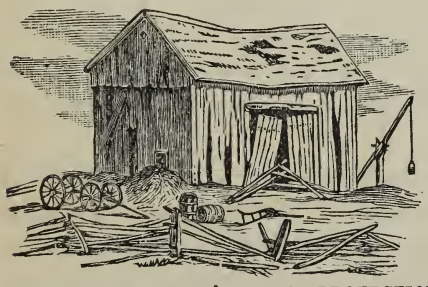
The food given may be compared to the fuel used under the boiler of a steam engine. So long as the water stands at 200 degrees no steam is produced; above 212 steam accumulates, until at length enough power is raised to start the wheels in motion. Thus it is with stock. Food must be given in proportion to the animal waste. With the thermometer at zero, and air stirring, whatever the feeding may be the animal cannot gain if exposed to the wind. Under shelter the natural heat of the

animal is conserved, and it remains comfortable. If the temperature of the stable can be kept at 60 degrees, the minimum of food only will be required. Just here two integers come in; the cheapness of food as against shelter, and the cost of labor. It is possible for food to be so cheap and labor so dear, and the price of cattle so low, that the interest

OLD STYLE FARM YARD.

on the shelter and the cost of labor would eat off the profits. It has been so in every section of the West first and last, and is so still in some new sections; but nowhere so low that cattle could be profitably fed without the protecting influence of gullies or timber to break the force of the wind. This is natural protection, and is the groundwork upon which all other is to be built.

Artificial Protection.



FARMER THRIFTLESS' MODE OF PROTECTION.

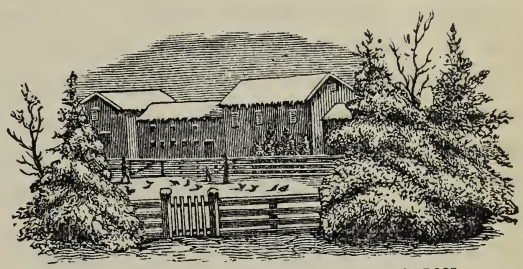
If the stock breeder has not timber, then the sooner he plants wind-breaks to protect his yards and farm buildings the sooner will he reap profit therefrom.

This is the crudest of artificial protection and yet one of great importance, both in Winter and Summer. In Winter it breaks the force of storms of wind, rain, sleet, and snow, and in Summer furnishes shade.

The next crudest means of shelter is a shed of posts and poles, and

covered with slough hay or straw, and slabs, or poles, filled in between with such litter as stock will not eat, the whole firmly pounded down to make it wind proof.

This, if well made and so low as just to admit a man to walk under, is both cheap and warm.



FARMER THRIFTY'S MODE OF PROTECTION.

Another cheap form of shed or shelter from storms is made by setting posts firmly in the ground in two lines, sawing the tops level, fastening on plate pieces, laying on scantling for the peak, supported temporarily, and nailing on boards, for a roof, at one-quarter pitch, up and down from the plates to the peak, covering the joints with wide battens and boarding up the side from whence the prevailing winds come. If twelve feet boards are used for the roof, a shed may thus be made over twenty feet wide, that will furnish good shelter for stock cattle where forage is cheap.

A Framed Shed.

A still better shed may be made by running the posts up eighteen feet, framing in cross-ties to support a floor. In the upper twelve feet of this shed a good deal of fodder may be stored, to be fed from when the weather is too inclement to allow it to be handled on wagons. From this we may go on to more and more elaborate structures until we come to the barn proper.

On all well ordered farms the owner fully appreciates the importance of shelter. Hence we see the feeding yards with one or two sides protected with more or less serviceable shed, until upon some farms we find the feeding yards entirely surrounded with this means of Winter protection.

In all this the owner must be guided by his pecuniary means. If he have not money enough to put up the better class of buildings, it by no means follows that he is to leave his stock without shelter until he is able to build.

So far as the simplest sheds are concerned, it is almost entirely a question of labor. In the case of simple sheds of lumber, it is simply a question of the cost of boards and nails.

Any intelligent farmer, assisted

PRIMITIVE PROTECTION.

by his hired help, can do the work. It is true, however, that few persons, the first time they build, do so economically. Let us see how this may be fairly accomplished. Suppose the structure is to be a simple roofed shed affair. Decide upon the length. The width should not be more than twelve feet for a single pitch roof. Allow that it is to be ninety-eight feet long. Set four heavy posts for the corners, three feet in the ground, and of the required height. The lower it is the warmer it will be, so it be high enough for the cattle to walk under the plates. Between the two end posts set, exactly in line, six posts each fourteen feet apart, and five and one-half feet high from the average ground line. Proceed in the same manner with the front, the posts to be nine feet above ground. At the back, now set seven lighter posts in the fourteen feet spaces. Saw them all off to an equal height, spike on four inch scantling from post to post in front, and two by four for the back. It is now ready for the roof, which is to be firmly nailed from front to rear. Board the front down to within five and a half feet of the ground, and the ends and back entirely to the ground. Thus the shed is complete, except banking up. This is important and will add fully one-half to its warmth. A good way to do this is to lay a line of sods one foot from the rear, and fill in with earth or old litter, carrying the banking at least four feet high; or, posts may be set two feet from the wall, with sufficient strips nailed thereon to hold the litter, and the whole filled in and rammed tight.

A Cheap Stable.

Do you prefer a stable, take the form given for a hip or double-roofed shed. Board the whole tight all around, leaving space for doors and windows; batten the cracks, lay the floor, put in stanchions or uprights for fastening the cattle, leaving a feeding place in front, and the whole is complete.

We prefer rings to slide up and down, upon standards three inches thick, to stanchions. Now this style of stable will not be strong enough to allow their being fastened to the floor above. Set strong posts seven feet apart and four and a half feet high, sawed off square on top, and three feet out from the wall. Prepare six-inch scantling to be pinned firmly to the posts, twelve inches from the ground, and on the inside next the wall; the scantling bored, each three feet, with two-inch holes. This will be wide enough for cows. Larger cattle must have three feet, three inches. Prepare other scantling bored in similar manner for the tops of the posts. Take three-inch smooth saplings; sharpen the lower ends just so they will drive firmly into the holes in the lower scantling when it is

pounded in place below. Shave the upper ends so they will fit the holes in the scantling above. Drive them solidly into the holes below, pinning each one fast with a half-inch pin. Slip a four-inch iron ring over each stake. Lay the upper scantling on top, entering the standards as you go. It is better that they have some play. Lower the scantling on top of the posts, and pin and spike them firmly to the posts. Cut stout rope six feet, six inches long, splice a four-inch loop on one end, whip the other end with small cord so it will not unravel; pass the rope through the ring and back to the loop so the end of the loop will be eight inches from the ring; pass the end of the rope through the loop, draw tight and make fast with two half hitches, or, better, whip the two portions of rope together as far as the loop. The cattle are then ready to be tied up, by passing the rope about the neck and through the loop, and drawing just tight enough so the animal cannot slip it over the horns. Iron chain bails that will last a life-time are kept ready made by agricultural implement men, and are much the cheapest in the end. Tied thus, cattle can easily reach their food, can lick themselves, can rest perfectly, but cannot reach to injure each other. A six-inch board nailed along the standard at a proper height, say about six inches below the tops of the shoulders of the cows, will prevent their reaching too far into the feeding passage.

About Barns.

The first thing to do in the erection of any building is planning to a certainty what accommodations are wanted and the probable cost. The farm barn, if there is to be only one, must be made to answer a variety of purposes. It must contain stables for cattle and horses, calf pens, shelter for sheep, a threshing floor, bays or mows for hay and grain, room for vehicles and many tools, harness room, granary, and, if the barn is a large one, room for placing a horse-power.

Years ago barns were seldom made higher than eighteen-feet posts. In these days of improved machinery it is as easy to fill a barn twenty-five or thirty feet high as one that is lower. The nearer square or octagonal a barn is and the higher, the less its relative cost, so that now barns are built of two or three stories when a slight declivity may be had for the site. If of two stories, the basement is cut up into stables for cattle and sheep, storage for heavy tools and machinery, calf pens, etc., etc.

The main floor will contain bays for hay and grain, threshing floor, a harness room and granary. Practically there is no advantage in the third story. The barn may be as high as is needed, the bay continued to the roof; the stable, harness room, granary, etc., may be floored over, and a

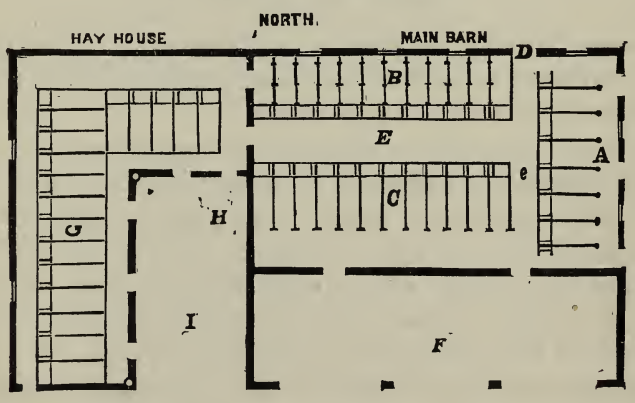
mow be had overhead; so, a floor may be carried over the threshing floor, and this space utilized in the same way. Practically you have the space at less expense.

A Quarter Section Farm Barn.

In the West and South, the farmer of 160 to 200 acres may get along very well with a side-hill barn forty-two by sixty feet. It will give ample room for a bay 16 by 60; a floor 13 by 60; horse stable 13 by 60, containing 5 single and 1 double stall, or 2 single stalls and 3 double stalls; a room for implements 10 by 13; a granary 12 by 13, and a tool room half that size; while the basement may be devoted entirely to the stabling of cattle, with calf pens, a sheep pen, and, if necessary, a shed enclosed on three sides. The granary will hold over 600 bushels of grain, and may be divided into bins for Winter and Spring wheat, oats, barley, and ground feed for stock. The basement may contain two rows of cattle stalls, with passage way between, six feet wide, with shoots leading to the upper part of the barn for delivering hay, grain, and other feed. This will leave a space 12 by 60, which may contain calf-pens and a place for sheep, and it may be so arranged by means of sliding doors that it may be entirely closed in inclement weather. This basement will contain stalls for thirty-two cattle, and the manure may be thrown directly into a cart or wagon and hauled directly where it is wanted.

This barn may, of course, be enlarged by adding on, to accommodate any required amount of stock; but, if a much larger barn than this is wanted, the square or octagonal form should be used. It will give largely increased room in proportion to the cost.

A Common-sense Barn.



MAIN FLOOR OF DAIRY BARN.

Above we give an outline of the basement of a barn forty feet wide and sixty feet long, with a lean-to overshot extending twenty feet in front.

This barn will contain about 100 tons of hay. The barn would be better facing the South if the lay of the land as to declivity will allow. The hay-house may extend twenty feet in width and height in the form of an L and of such a length as may be wanted for storage, say forty feet. This barn, if the space below the hay-house is utilized, will stable six horses and forty cattle.

The basement of the main barn may be divided into stabling as follows. A, horse stables 12 feet deep, with mangers two and a half feet wide for hay, with suitable troughs for grain and manger for hay. B and C are cattle stalls. Those in B hung with swinging gates, opening side ways, G the same, but each stall having a separate gate entering direct from the yard. E is the main entrance eight feet wide and may contain feed chests; *e* is an entry five feet wide, with steps up to door D, and having an entrance into the horse stables at each end. F is the overshot or shed. G is the portion under the hay-house to be utilized in stalls, if the hay is not desired to run clear to the ground; and H is the yard connected therewith. If necessary this may be roofed over making additional shed room.

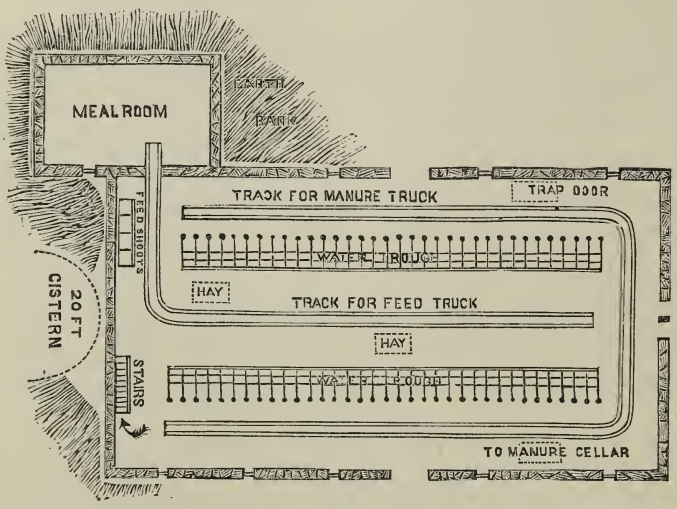
Square and Octagonal Barns.

In the square or octagonal barn the bay is in the centre, in which a vast compact mass of hay can be kept, and this will run from the basement to the peak. The basement will be used as a stable, and if desired the main floor may also be so used; modern builders understand perfectly the art of making a floor proof against the leakage of liquids.

One especial advantage in the octagonal shape for barns, when a large number of cattle are to be fed, is, the roof is easily supported and contains more economy of space for its size than any other form except the circular. In this the hay will be in the center, and the cattle next the wall, facing inwards. Above the cattle will also be a mow for hay, except such portions as are wanted for granaries, grinding machinery and other conveniences. At the peak may be a windmill of sufficient power to do the pumping of water for the stock, unless it be feasible to conduct water by its own gravity. In this case it may be used for grinding and cutting fodder.

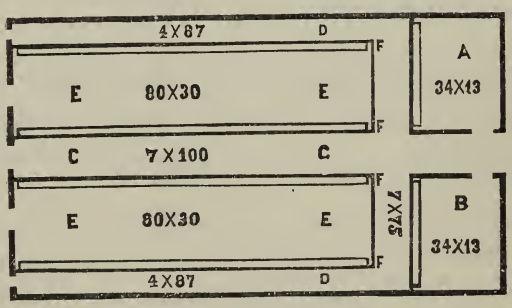
Let us see what an octagonal barn sixty feet in diameter will hold. The width of the stable will be twelve feet, and the feed next the bay six feet, making eighteen feet in all. This running clear around will have a central core of twenty-four feet, besides the entire area, from the floor above the stock. The stable will be one hundred and eighty feet in circumference, and, allowing three feet, six inches to each steer, will accommodate fifty head of steers, or if cows, a still greater number.

Below we give the plan of the dairy barn which will explain itself. We have represented a cistern and also the meal room, protected by an earth embankment, so it may be used for roots and other feeding material that would be injured by freezing.



PLAN OF STABLES IN BASEMENT.

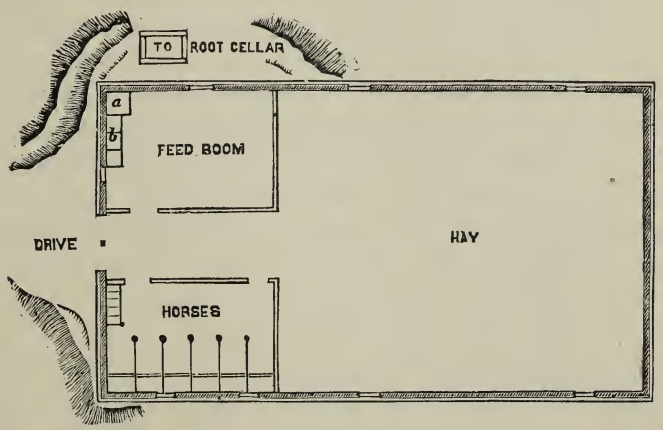
The following diagram will show a compact basement for a Bank Barn for feeding cattle and also accommodating a limited number of horses and milch cows, to be seventy by one hundred feet square.



CATTLE-FEEDING BASEMENT.

A is the horse stable with six stalls; B, cow stable for six or eight cows; C C main entry; D D two small entries, running on either side of the

cattle stables; E E E E are the cattle stables, 80 by 30 feet each; and if the cattle are placed 4 feet apart, will accommodate forty head of steers for fattening.



MAIN FLOOR OF DAIRY BARN.

To show another plan we give a diagram of a dairy barn fifty by one hundred feet. In the plan of the main floor *a* is a ventilating shaft, and *b* feed shoots to basement through trap door which will be shown in the plan of the basement.

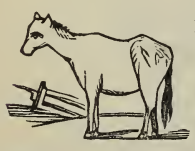
A Square Cross Barn.

For a large number of cattle we know of no better form than a square barn for the center, with four wings running therefrom, each 30 feet wide by any desired length. In this arrangement the cattle might be placed with their heads to the wall, leaving a passage-way between each two rows, by which the manure might be taken up and carried away in carts. In some parts of the West cattle-feeding is carried out on an immense scale. Feeders are already beginning to ask, how best they may build stables to save cost in feeding, and at the same time place the cattle in the best possible position for economical feeding.

A writer in the *National Live Stock Journal*, under the signature of "Alimentation," gives data for a barn to feed 1,000 head of cattle. The principal objection to the plan is the concrete wall advised for the basement. In a building of this size and weight, it will be found to be quite unreliable in the West. The basement should be built of good solid stone, or the best hard burned brick. In lieu of this, if concrete must be used, the weight of the building should be on stone piers. The details

for building the barn are given as follows, the wings being 30 feet wide and 200 feet long:

"This square cross barn will have all its extreme parts equi-distant from the center. It will be the same distance from the quadrangular center to the extreme animal in either wing as from the octagonal center. By doubling the width of the wings, we dispense with eight long sides 200 feet each, or 1,600 feet; and as the ends of the four wings are the same length as the eight wings, the saving in outside wall is 1,600 feet. And if these sides are 20 feet high, and boarded up and down with a two-inch batten, it will take 36,933 feet to cover these sides thus dispensed with. It will also save all the outside and interior posts of the four wings dispensed with, as it will require no more posts in a wing 60 feet wide than in one 30 feet wide. This will make a saving of about 22,000 feet; and the outside sills and plates on these long sides will be saved, amounting to 24,000 feet, besides girths and braces — amounting in all to a saving of 100,000 feet. The roofs and floors will cover the same number of square feet as in the eight wings, and cost the same.



WINTERED WITHOUT SHELTER.

WINTERED WITH GOOD SHELTER.

"It would also save 14,400 cubic feet of wall. The whole saving by building the wings 60 feet wide could not be less than two-fifths of the whole cost of the barn; and the convenience and economy of labor must be even greater than with the eight narrow wings. This square cross barn has the capacity to feed conveniently and comfortably one thousand head of cattle; and it now remains to notice some of the details of construction.

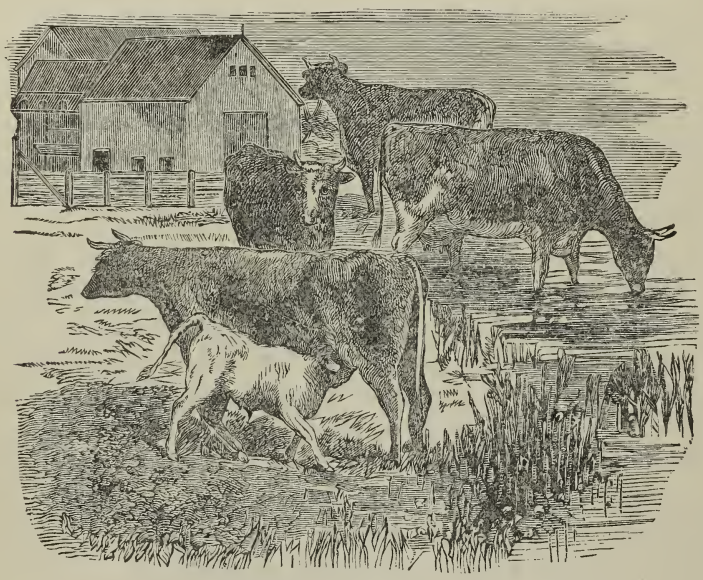
"The quadrangular center, 60 feet in diameter, may be built with large corner posts, say 14 by 14 inches square, 37 feet long, and the plates and girths of the wing may be framed into these posts; but it probably would be better that the wing should have separate corner-posts, and they be bolted to the posts of the center. The quadrangular center should be high enough above the wings to clear the ridge of its roof. This would require the posts of the center building to be 17 or 18 feet longer than the wing posts, as the ridge of the wing roof should rise at least 17 feet in 60 feet, and come up under the cornice of the center building; as these wings will cost about the same money with posts 20 feet, and the latter height will hold about 40 per cent more, and as this storage room will be wanted for so many animals, it will be better to provide room in abundance, and make the posts twenty feet long.

"The floor in the wing above the basement will run lengthwise of the building, and it will be 16 feet wide, so that the posts on either side of the floor, running up to the cross-beam over the floor, may stand on a sill running lengthwise over the basement, and eight feet from the center, supported by the stanchion timbers. These two sills will be strongly supported the whole length by the stanchion posts, placed only 38 inches from center to center, and will consequently hold the whole interior structure above. The bays on each side of the floor will be 22 feet wide; there will be no loss in so wide a floor, as the hay may be mowed one or two feet upon each edge of the floor if more room is desired. There will be 42 bents, the outside posts being about 18 feet 2 inches from center to center. The top of the cross-beams, running from side to side of the barn, will be 13 feet above the sill, and will be spliced at the post, or between the posts, on either side of the floor. On three of the bents the cross-beams should be carried up nearly to the plates, and the posts at the side of the floor must also be carried up to support the beam. The three bents (every third one) will tie the barn together, and being so far apart, will not obstruct pitching with a horse-fork. These high beams, besides being pinned to the outside posts should have a stirrup around the post coming back ten inches upon the beam, with a three-eighth inch bolt through the stirrup and the beam, turned up tight with a nut, and if the beams are well spliced in the middle, this will hold the barn firmly from spreading at the plates. Now, to prevent this long wing from rocking or swaying by a strong broadside wind, these bents with the high beams should have a long stiff brace running from the foot of the post on the side of the floor to the outside post just under the high beam. Such a long brace on each side will hold the barn rigidly from rocking. And while speaking of braces, let it be remembered that a brace is valuable just in proportion to its length. The braces from the outside posts up to the plates show a four-foot run. They will assist very much in sustaining any weight upon the plates.

"It is not intended to have any purlins in these wings to support the roof, even though they be 60 feet wide. The brace on top of the beam will have a run on beam from post of 8 or 9 feet, running up the post just under the plates and fastened by a bolt. This will hold the plates absolutely rigid, and the roof will not spread them. The rafters should not be placed more than two feet apart, and the collar-beams should be 1 1-4 by 5 inches, and placed six feet below the ridge, with every other pair of rafters double collar-beamed; that is, with a collar-beam nailed upon each side of the rafters. This will make a strong shingle roof. The collar-beams will be some 20 feet long, and will be about as good a support to the roof as purlin-beams. The collar-beams should be as high as the

barn would be likely to be filled, so that no room will be lost, and the barn will be practically free from obstruction to pitching with a horse-fork.

"In the bents, where the cross-beams are raised nearly to the plates, there must be a beam framed into the posts on each side of the floor, 13 feet above the sills, to correspond with the other beams over the floor, upon which scaffolding may be placed for using the room over the floor. It remains only to be mentioned that the interior sills are four cross-sills, 40 feet apart, to tie the barn together at the bottom, and two sills running lengthwise, one on each side of the floor—that is, the centre of each of these long sills is placed 8 feet from the centre of the barn. The joists for the bays will run from these long sills on each side of the floor to the outside sill—about 21 feet. Each of these long sills come over a row of stanchion timbers in the basement below."



FARMER THRIFTY'S CATTLE.

The reader will see that these wings above the basement are built in the simplest manner, using no surplus material, and as cheap as may be consistent with strength and durability.

Basements for Cattle.

"We will now examine the construction of the basements of these long wings. The wall under each of these wings, if built of concrete, 15 inches thick at bottom, 12 inches at the top and eight feet high, being 460 feet long, would contain 4,140 cubic feet, and could be built in most

places for 10 cents per cubic foot, or $414 per wing. The wall under the center would be 1,440 cubic feet, and cost $114. The wall under the entire square cross barn would cost $1800. The long sides would require something to stiffen the wall sidewise; but a pier built against the wall on the inside would be in the way, and on the outside would look unsightly; so to avoid the necessity of such piers, let a T be made of strong iron, say three-fourths by two inches. The long end of the T would be about 20 inches, and built into the wall, and the cross lie across the top of the wall directly under the sill. The end of the T should project beyond the sill on each side far enough to have a three-quarter inch hole punched, into which to insert a piece of the same flat iron, six inches long, rounded at one end. This will attach the wall to the sill. There should be four of these T's for each side—one near each cross sill 40 feet apart. This will hold the whole wall to the beam, and prevent any swaying. These long sides will give room for inserting

FARMER SLACK'S SHELTER.

plenty of windows for light, the frames being into the boxes, and the concrete built over them. The sash may be hung on a pivot in the centre, so as to open easily to give ventilation at certain seasons; but the fresh air should be introduced through the wall near the bottom, through hard burned earthen or pottery pipes, 15-inch bore, just long enough to reach through the wall. These pipes may be laid in the boxes, bedded in the concrete, and the concrete tamped down upon them. They may be placed ten feet apart, and will not weaken the wall. Close covers may be fitted to the inside, so as to shut them out at will; and with proper ventilators

to discharge the heated and vitiated air through the upper part of the barn, there will be a constant circulation of fresh air through the basement.

One other point must be mentioned in reference to the wall. A concrete wall contains a large amount of moisture, and if the sills are to be placed on before the wall becomes quite dry, which is usually the case, the moisture will pass up into the green timber of the sill, form a coating of lime on it, and prevent the sap from escaping, and the result is a rapid decay of the timber. To prevent this, take well-seasoned pine boards, 12 inches wide, coat one side with gas tar, and bed this tarred side in the mortar on top of the wall. The sills are laid on this leveled board, and no moisture can come through this board into the sill to rot it.

Arranging the Basement.

These long stables must be laid out so as to render the labor as convenient as possible. There must be easy access to every animal in the stable, and this becomes more important when one thousand cattle are to be provided for. Cattle are most easily attended when placed in double rows with their heads turned towards one feeding floor.

In the long basement, the first row of stanchion posts will be placed seven feet from the first wall, on the side of the first feeding floor, 14 feet wide. On the other side of the feeding floor is the second row of stanchion posts, coming up under one of the long sills, as described before. Two and one-half feet being occupied by mangers on each side of this floor, will leave nine feet for a drive-way. Along this floor may pass a cart or wagon, with green food in Summer, or fodder in Winter. The third row of stanchion posts will be 16 feet from the last, under the second long sill, on the side of the second feeding floor; and the fourth row will be fourteen feet from the third, on the other side of the second feeding floor, and seven feet from the other wall. Here two rows of cattle stand, with their tails to the walls, and the two middle rows stand tail to tail, facing upon opposite floors. The largest animals should be placed in middle rows, as there is the most room. These stanchion posts are placed 3 feet 2 inches from center to center, and the cattle are best fastened to the center of a chain stretching from staple to staple driven into each stanchion post. These chains slide up and down on staples. The mangers may be placed 20 inches from the ground, and, with long staples, the cattle may lie down comfortably. One of the best ways to feed cattle, with plenty of bedding and muck for deodorizing, is to let them stand three or four months on tan manure, and, the mangers being placed high, the manure may accumulate two feet deep under them, and they may keep quiet clean, with the bedding and muck, and the manure

will be trodden so hard as to ferment very little. When a lot of cattle are sold, then wagons may be driven through to carry off manure. I have seen cattle fed in this manner, carded daily, and kept quite clean, standing on their manure for four months.

These feeding floors, as described, stretch through the whole length of the barn. A feeding car passes through two wings, and, having a turn-table, may pass through any wing. Feed may be dropped through a chute on the side of the upper floor into the car wherever placed on any feeding floor. This form of barn gives every facility for cutting and cooking the food—a larger engine, placed in the center, cutting, grinding and cooking all the food; and this also offers the best facility for soiling three thousand head in Summer, if such should be necessary. In the West, however, where only the feeding of such large numbers of cattle would be profitable, soiling is out of the question.

Adapting Means to the End.

No person can possibly know so well what an individual wants as himself, if he be a reflecting man. The architect scarcely ever gives attention to the planning of barns. The best barns in a country are those of intelligent farmers who have carefully observed the conveniences of various kinds in the barns of their friends in the localities visited, and who when in building their own varied them to suit their own wants. For this reason we have simply given outlines of those illustrated with descriptions of others adapted to various numbers of cattle. See pp. 588, 590, 591. To give the cost would be a waste of space that may be better employed. This will vary with locality and the price of material, and any master carpenter or mason will quickly estimate them. As a rule, the elaborate and well furnished structure is not the most convenient one, but those which have the greatest number of permanent conveniences, and in which the space is most thoroughly economized. Hence within the last few years, or since the general introduction of improved machinery, farm barns have undergone a complete change in the manner of construction.

Formerly barns were comparatively low structures where everything had to be done by manual labor; it was not economy to pile up hay, grain, or other farm produce, story after story; the labor of lifting, or carrying did not pay. Since the invention of hoisting machines and hay carriers, the invention of modern windmills, grinding mills, horse powers and other labor-saving machinery, twenty-five feet posts are not unusual, and no barn should be built of less than two stories. The gain thus secured is abundantly worth what it costs.

There are few farms where the drainage is so poor or the land so level but that a declivity sufficient for a basement barn may be had, by throwing the excavated portion up to assist in forming the trackway or rise to the main floor. Windmills are now so nearly automatic in their working that they may very safely be trusted to pretty much take care of themselves. Therefore, in all the more pretentious farm barns, they should be built with special reference to the erection of a windmill on top. This may be used for a variety of purposes, cutting fodder, grinding grain, pumping water, being its principal work. If the water is collected in a reservoir in the center of the mow it will not freeze, and the pressure will always be equal, and thus the water may be carried in pipes any distance, to the house or the dairy, and become a most valuable economy.

In the building of barns of superior size we have given descriptions of all but the circular barn, which can hardly be called a practical or economical structure, and the octagon barns will come under the same category; for while economical in respect to space, they are more costly to build, if for no other reason than that they are unusual. We therefore recommend the square barn in every case when the width is to be forty or more feet, with not less than twenty feet posts. This, with the the basement, will give two or three stories as necessity may require. The basement of course will be used for the stables, and if additional room be needed one or two wings may be added, and when farther space is needed two more. The diagrams showing the internal arrangements may easily be obtained to suit such a structure while pursuing the general features of economical and labor-saving utility.

Summer Shelter.

While the question of Winter shelter is of the first importance, it is necessary that Summer shelter be provided, and also for protection against the inclement storms of Spring after stock has been put upon pasture. During the feeding season the sheds and barns will suffice; before pastures are flush the Winter shelter can be utilized, for some food must be given night and morning. During the prevalence of storms the stock will of course be kept up and fed. Later, however, it will not be found practicable. What is wanted is a range where stock may not only be secure from the winds of driving storms, but where they may retire for shelter during the extreme heat of Summer days.

We do not believe in shaded pastures. They are poetic but not practical. The object in keeping stock is to make them eat as much as possible. The pasture should be devoted to grass. If shaded by single trees here and there, stock will very often haunt these when they should be

feeding. While in motion in the act of grazing they do not suffer from heat. Therefore it is better that they be obliged to do some travel to reach the shade, and this shade if natural will generally have water near. If not, the artificial shade should be given at such places where water may be had from mills or ponds most cheaply.

A PASTORAL SCENE.

The accompanying cut will show how this artificial shelter is accomplished both by isolated trees in the pasture and by clumps and groves in the distance. As previously stated, the single trees we condemn, and they have been introduced to illustrate the point, and at the same time give effect to a most pleasant pastoral scene, and which any farmer may obtain in a gently undulating country.

Where to Plant Shelter.

This shelter should be planted along the crest of ridges, about gullies and ravines, and in fact wherever the soil is not adapted to cultivation. These points will be especially sought during the heat of Summer, and the timber will eventually more than pay the cost of planting in any prairie country. All high points are generally free to a great extent from biting insects. The ravines will afford shelter from winds and driving

storms, and also will be valuable as places where permanent water may be had either naturally or artificially by draining. In lieu of this plant shelter belts and groves near the low places where water may be had, or near natural water holes on the farm.

What to Plant.

For dry soil, anywhere south of 42 degrees, the Catalpa (*Speci osa*) will be found hardy. The variety *Big nonioides* is not hardy in the West north of about 38 degrees. Black walnut is valuable, so are all the maples, the cotton-wood does well almost anywhere, and if care is taken to procure cuttings of the male variety, (this tree bears male and female flowers on separate trees), you will have no trouble with the blowing about of the cotton during seeding time. Evergreens may be planted almost anywhere if the soil be moderately dry. The Norway spruce is most valuable, and next to this the white pine. For low lands, cotton-wood, the soft maples, and the white, the black and the golden willow will be indicated. Thus the farmer will find that this question of shelter, while one of the most important of the many connected with farm economy—the points relating to Summer shelter—will in the end prove one of the best paying investments in a prairie country of any in the whole category.

CHAPTER V.

HOW TO PASTURE, FEED AND WATER.

ABOUT PASTURAGE.——CLOVERS THAT DO WELL.——UNDESIRARLE CLOVERS.——ALFALFA.——THE TRUE GRASSES.——TIMOTHY, OR CAT'S TAIL GRASS.——BLUE GRASS.——RED TOP.——ORCHARD GRASS.——FOWL MEADOW GRASS.——TIME FOR PASTURING.——WATERING.——FEEDING STOCK CATTLE.——HOW TO FEED.——FEEDING MILCH COWS.

About Pasturage.

The subject of pasture and meadow is one of the most important with which the farmer has to deal. It makes feed in Summer and forage in Winter. Yet, in the United States, nearly all our meadows consist of one clover and one grass; in other words, timothy and clover are our great meadow plants, and the addition of blue grass to this forms the bulk of our pasturage, always excepting, of course, the vast areas of wild grasses that still cover the great prairies and vast plains of the West, yet to be brought into cultivation by man.

Until within the last few years, or until the dairy interest began to assume such gigantic proportions, farmers got along well enough with these; for, where stock raising for beef is the sole object, and wild grasses are plenty and grain easily raised, and consequently cheap, a very few grasses will suffice; but the impetus given to dairying within the last few years, has fairly shown that the best results, nay, that even fair success cannot be had with a few grasses. This the dairymen in New York State came to understand years ago, and yet so little was known of the adaptability of varieties to soils and climate, that our best farmers worked blindly in experimenting, and unfortunately, our botanists could do little more than furnish long strings of mere classical names of varieties as they were known in books, and could give almost no information as to their adaptability.

Clovers that Do Well.

Practically, the clovers are confined to three species. First, red clover, natural to all soils that are adapted to the cereal crops, as wheat, rye, barley, oats and corn, or such rich soils as do not heave under the frosts of Winter and Spring. If so, clover is apt to be thrown out, or at least to be so heaved as to be practically worthless, especially so from the fact that it is really a biennial plant; that is, dying out at the end of the second year if allowed to seed.

The next clover in general use is Dutch, or white clover. This does well on soils somewhat moist, although it will not stand flooding. It is not especially relished by cattle, and at some seasons is apt to give horses what is termed the slobbers; that is, it causes them to form saliva to such a degree that it drops from the mouth freely. Cattle do not relish it, and it can hardly be called good feed for horses. A small portion of it in a permanent pasture does not come amiss, yet it is so natural to many soils that, like the plantain, which the Indians have termed the white man's foot, white clover they have called the white man's grass.

The only other variety of clover that we can recommend for cultivation, is Alsike, sometimes called Swedish clover. This does well on moist land, and even bears some flooding. We consider it the next in value to red clover, and altogether better pasture than white clover. It also makes good hay on soils too wet for red clover.

Undesirable Clovers.

There are a number of other species of clover, some of them indigenous to the West, which we only mention as a caution against their being sown. These are; two species of so called Buffalo clover; the upright and the running Buffalo clovers; the upright or yellow clover; and the low hop clover, a half-creeping variety. There is only one more variety worth mentioning, and this simply as a warning to farmers not to sow it, except for bee pasturage, and then only when it may not become a troublesome weed. We have reference to the tree clover or Bokhara clover, specifically the white-flowered melilotus. It has been recommended as valuable for soiling; that is, for cutting green for feeding to stock in stables. We give the same advice about sowing this clover that the crabbed lawyer did to a young client who asked his advice about getting married—*Don't.*

Alfalfa.

The case is different with alfalfa, the Spanish name for a plant known botanically as *medicago*, and, in English by its French name Luzerne

This is valuable in soils adapted to it, deep dry soils not subject to hard freezing in Winter. In California it has become one of the standard forage crops. In some of the far west plains country it will undoubtedly be found to stand well, as it will in Texas and New Mexico. In South America, in the vast grazing region, it has become thoroughly naturalized, and is well worthy of trial wherever the Winters will not be too cold for it, say south of forty degrees north latitude.

The True Grasses.

It is to these that we must really look for our pasture plants, outside the few clovers we have mentioned. It is a vast, as it is the most important of plants to man, comprising some 230 botanical genera, and not less than 3,000 species, and includes all our cereal grains, as wheat, rye, barley, oats, corn, etc.

It would not be in place in this work to enter into a history of grass, and the characteristics of the several species, valuable as they may be. Our readers must therefore be content with a list of some of the more important varieties, as they have been tried, and their seasons, and some of their characteristics; and this more for their value as pasture than hay, and for reasons previously given.

Timothy, or Cat's Tail Grass.

The first in importance is timothy; a better name, as more perfectly describing its characteristics, would be cats-tail grass, by which it is known in England. It does well in all clayey or clay loam soils that are not too wet, and makes the best hay of any of our grasses. For pasture it is among the least valuable, if we except cattle, since one peculiarity is that just at the ground it forms a bulb, which if bitten in close grazing, as horses, sheep and hogs are apt to do, it dies. It is also a grass that will not bear hard tramping.

Blue Grass.

This is the great pasture grass of the Western States, in its two varieties, Kentucky blue grass, which flourishes best south of forty degrees north latitude, and wire grass, which is found well up into Wisconsin and Minnesota. Here again is confusion of common names. In Pennsylvania it is called green grass, and this is really a suggestive name. It really remains green early and late, longer than any other of our cultivated grasses.

Blue grass forms a tough, firm sward, springing early in the Spring

growing late in the Fall, and holding its substance well in the Winter. So that after being pastured in Spring if allowed to grow on through the Summer and Autumn, cattle and other stock may be wintered on it admirably, when deep snow does not cover the ground. Both varieties are found in their best perfection in limestone soils, although they do well according to latitude on all strong, rich, and even on some rather thin soils if well drained. Neither variety is adapted to wet soils. It cannot be called a hay grass, its great value being for pasturage.

Red-Top.

The next grass in importance, because found to do well on a great variety of soils, is red-top. It makes good hay and is valuable for pasturage. It should be more generally cultivated than it is, being adapted to a very considerable range of soils, neither very wet nor very dry. As before stated, in Pennsylvania this is called herd's grass, and we may add in Rhode Island it is known as Burden's grass. While red-top has a goodly range of soils to which it adapts itself fairly, it does best on a rather moist soil, flowering rather late, or about the same time or later than timothy. It dries out considerably in curing into hay, and is not very rich in sugar, gum or starch, three important elements in feeding. It is a strictly perennial species, and forms a pretty dense sod, when well established.

Orchard Grass.

This is really one of the most valuable grasses for extensive trial as a first-class pasture grass in the whole list of cultivated grasses. The wonder is that a grass so generally regarded as excellent in Europe, should have made its way so tardily in this grass country. This is probably from its habit of growing in tufts where sown thinly. It is one of the earliest of the grasses to start in the Spring, is strictly a perennial, starts freely after being grazed or mown, and if sown thickly makes excellent hay. It thrives better than most of the grasses in a partial shade, and hence its common name, orchard grass.

For pasture it should be sown at the rate of not less than two bushels of seed per acre,—three bushels is better. It is very light, weighing only fourteen pounds per bushel. When sown for hay we have had excellent success by seeding at the rate of sixteen pounds of orchard grass, and ten pounds of clover per acre. It is excellently adapted to sowing with red clover, since it blossoms more nearly with clover than almost any other of the grasses.

Fowl Meadow Grass.

This is another most valuable grass, considered especially so for hay, and to our mind quite valuable for pasturage, particularly for dairy stock. Like prairie hay it is quite free from dust, and at the same time it possesses all the essential elements of nutrition in a high degree. In all new countries the first dependence must be on the wild grasses. The real difficulty is, farmers do not undertake the cultivated grasses until forced to. If a trial of the important varieties here noticed shall lead to the testing of still other sorts, the time will soon come when our farmers will wonder how they could have gone on so long without appreciating at their true value many varieties, that the aim and scope of this work precludes even the mention.

Time for Pasturing.

It is important that cattle be not only fully fed but that they have their feed at regular intervals. Where stock are driven to and from pasture they should be turned on soon after daylight in the morning, and not taken out until sundown. It is especially necessary that they get the grass while yet it is covered with dew. So, where stock are kept and fed in stables, the first feed should be given early in the morning, just what they will eat clean. This should be supplied not less than three times a day; and at night, to insure full stomachs, some extra feed as meal, shorts, etc., should be added.

Salt should be kept where the animals can get it at will. They will thus get enough for their wants, and just as they want it, and will eat less than where supplied at the stables, or out-of-doors, at irregular times. Irregular feeding of salt is one of the worst possible practices. Salt is a cathartic when given in large doses, and this danger should be avoided.

In Winter, whether the animals are kept in stables, in sheds, in feeding-yards or in the shelter of groves, the same regularity of feeding should be observed. Stock should also be graded, if possible, so there will be no very strong and very weak ones together. And those of a given age should be fed together. Where animals are fed in groves or in fields a much larger, and, in fact, more irregular drove, as to age and strength, may be kept together, than under open sheds or in close feeding-yards. Feed early always, as soon after daylight as the animals can see to feed, and let the last mess at night be given so as to be well finished just before dark. When fed in stables the same rule should be observed. Early and late feeding of good fodder, and in such quantities as they will eat tolerably clean, is what keeps growing animals going right along. This

is what the wise feeder seeks, for thus he secures the best possible gain, with the least loss in daily natural waste of the physical system.

Watering.

Whether it be Winter or Summer, it is absolutely necessary that cattle have an abundance of water. Without this, given at regular times, there can be no profit to the feeder. Cattle may be driven to it twice a day, if the conditions are such that they cannot be fed in the same range where the water lies. When cattle are kept in stables, it is altogether better that the water be conducted there in pipes so as to run directly into their drinking troughs. It will be found cheapest in the end. If there is no living water, do not depend upon holes cut in the ice of ponds. It is not only dangerous to the cattle, but will cost more in the end than any other plan of watering. If the water is to be taken from wells, or ponds, erect a good windmill, with suitable tanks, with pipes so they will not freeze, leading to ample troughs. Let these be in the yards where the stock take their rest, or else in the feeding range. Then see that they have plenty of it, and plenty of salt where they can lick it at will. If the cattle are to be fed out-of-doors on ear corn and hay, see that proper troughs are provided for corn and racks for hay; let them be large and ample. Where this is done, close yards should be provided with warm shelter and water.

Feeding Stock Cattle.

In wintering stock cattle the main dependence will be hay or corn fodder. These, if good, are perfect food, that is fed together, or hay fed alone will keep cattle growing, if they do not suffer from the cold. In feeding the same rule should be adopted as in fattening cattle. See that they are not given enough to waste, but do not force them to eat rough, coarse, stalky or weedy hay clean. No animal ever did well on food it did not like. To make money in growing cattle they must not go hungry Winter or Summer. If the fodder is prairie hay see that the best and softest is reserved for the calves, and next best for the cows. The oxen and steers will do fairly well on hay somewhat coarser.

How to Feed.

Calves should have some grain daily; oats are best, one quart each, or the equivalent in other grain. Cows expected to calve the succeeding Spring, should have from four to six ears of corn daily, or its equivalent in some other grain; and oxen when not working, about the same.

When working, give the same as to a fattening steer, or about a half bushel a day.

Cattle intended for fattening the succeeding year should have especial care the previous Winter. They should have feed enough to keep them growing right along, say about half the quantity of grain given to fattening steers, that is, allowing the feeders do not believe in forcing the animal from *calfhood* constantly, until ready for the butcher. The best and most successful feeders do force, and none that we know who have ever tried it could ever be induced to go back to the old way of letting stock make a gain in Summer, to lose half or more of it in Winter.

Feeding Milch Cows.

Whatever the plan of feeding or sheltering cattle for the butcher—of course, fattening cattle will have more attention given them, so far as food, water, and shelter are concerned—milch cows *must* have soft food. No dairyman ever made any money by feeding cows in milk on dry hay, ear corn, or dry grain; for cows it must be ground.

In feeding, the owner will, of course, be guided by the relative value of food in the market. If possible, a little ground oil-cake should form a daily portion, about half a pound per cow. In all the West, corn-meal is the cheapest food, except in the neighborhood of large merchant flouring mills. One great difficulty with corn-meal is it is heating. It should be fed almost measure for measure with bran; ten pounds of this with the addition of half a pound of ground oil-cake, with plenty of good hay, will be liberal feeding. If the cow will eat fifteen pounds of meal and bran, it will be wise economy to give it to her. She will not eat so much hay, and in a corn country hay is dearer than corn, and as a rule an acre of corn is raised fully as cheap as an acre of hay.

CHAPTER VI.

BENEFITS OF KIND AND CAREFUL TREATMENT.

FEEDING FOR PROFIT.——AS BETWEEN WELL AND ILL KEPT STOCK.——HEAVY WEIGHTS.——PROFIT IN EARLY MATURITY.——MAKE BEEF YOUNG.——BABY BEEF.——FEEDING; COST IN ENGLAND.——SUMMER FEEDING.——ANIMAL WASTE.——ANIMAL HEAT.——ADVANTAGES OF SUMMER AND WINTER FEEDING.

Feeding for Profit.

It should require no argument to show the benefits of kind and considerate treatment in the rearing of live stock of any kind, and in the treatment after they become mature. One reason why so many persons fail to be successful in fattening stock is that they do not use due consideration in their treatment. The man who kicks and clubs his stock, or allows his hired help to do so, never yet produced a prize steer, and never will. Obesity and activity do not go together, neither will undue excitability allow of a steady increase in fat. Hence the feeder, for the sake of his pocket, should see that fattening cattle are kept entirely quiet. To insure this the sagacious breeder avoids not only cattle naturally irritable, but those raised by persons of known bad or brutal temper. We have known a stable of cattle thrown off their feed for days by a sudden fright. Those frights are quite apt to occur from the slightest causes. Where strange cattle, raised half wild, are confined together—and this is not rare among stock that have been picked up indiscriminately, and what are known as woods or prairie cattle—the first effort of the sagacious feeder is to get the confidence of the stock. This is only accomplished by gentleness, not by any means inconsistent with firmness. The cattle must know and obey their master. Their knowledge of him must be that they receive food and kind treatment at his hands, and not stabs with the

fork, nor beatings with the handle, or kicks, because they happen to stand within reach of some brutal feeder. The inference is that the humane man is apt to have humane help; the brutal stock man will have brutal help, and the stock will be very apt to partake of the character of their master.

As between well and ill-kept Stock.

Aside from some wealthy professional men, having suburban farms, stock is kept solely for the profit it will bring. The stock of amateurs are not only carefully housed and fed, but they are kept at the height of perfection, so far as costly appointments and careful grooming is concerned. The practical man arrives at the same results in a different and cheaper way, but none the less certainly. His shelters may be of the most homely kind, even made with poles and slough hay, but are warm and comfortable. He cannot afford iron mangers and water pipes through his stables, but his troughs are tight and solidly built, and his animals are regularly fed and watered. He will not have blankets in winter and sheets in summer, but his animals will be well and carefully fed, and sheltered from the earliest age until ready for sale.

The humane man will get ten dollars more for a cow because she will be gentle and well trained to give down her milk without resistance. His steers will bring from one to two cents per pound extra in market, for the reason that the constant care given them will have resulted in extra weight and condition. Let us see what two cents per pound amounts to. His steer of a given age, say three years, is fed from birth so that it has never fallen in condition, but has constantly gained, and will weigh from 1300 to 1600 pounds, according to the breed. The steer of the man who does not believe in feeding nor properly treating his animals, will weigh off of grass 900 or 1000 pounds. The good feeder will get five-and-a-half cents per pound gross weight, or $71.50 for the 1300 lb. steer, and $88 for the heavier one. The poor feeder will get, say three cents per pound, or $27 to $30. One may see this every day of the year at the stock-yards of our western cities. It does not cost $20 more to make the good steer than the poor one; so the enhanced profits are nearly $25 in the one case and $48 in the other; in other words, the good and humane feeder gets the enhanced price on the poor feeder's 1000 pounds, and on what he has put on besides by his considerate care and constant good feeding. We have partially shown this in another part of the work, in alluding to the daily animal waste. That is an integer. This animal waste may be produced excessively, whatever the system of feeding, if animals are subjected to frights and bruises, as well as by exposure to storms and lack of sufficient food.

Heavy Weights.

Until the inauguration of the Chicago Fat Stock Show, under the auspices of the Board of Agriculture of Illinois, very little reliable data could be had as to gain in feeding animals of various ages. It was well understood, however, that the young animal gained faster in proportion to the amount of food consumed, than the mature animal, and that the older and fatter the animal became, the less the daily gain. As showing actual facts we append the statements of exhibitors, sworn to in some of the more important classes shown there, and the reports of committee thereon:

"Among the heavy cattle were the following, and credited to weigh, as taken from the pasture and feeding yards, as follows: The steer Gov. Morton, 3,190 lbs; Burnside, 2,870; Hoosier Boy, 2,640; Nels. Morris, 2,840 pounds. The following are the actual weights as given by the committee, on animals 1 year to 4 years old:

Messrs. Graves & Co., one steer 4 years old, 2,445; one steer 3 years old, 2,060.

A. F. Moore, one steer 2 years old, 1,786.

J. D. Gillett, one steer 3 years old, 2,139.

Wing & Thompson, one steer, 4 years old, 2,240; one steer 4 years old, 2,166; one cow, 1,525; one cow, 1,610.

John B. Sherman, one steer 3 years old, 2,019.

J. N. Brown's Sons, one steer 2 years old, 1,446; one steer 2 years old, 1,449; one steer 2 years old, 1,636; one steer 2 years old, 1,316; one steer 2 years old, 1,246; one steer 1 year old, 1,338; one steer 1 year old, 1,249; one steer 1 year old, 1,193.

Dexter Curtis, one cow, 1,833; one cow, 2,042; one cow, 1,936."

In this, of the interesting facts shown, is the great weight attained by one, two and three-year-old steers, as well as the great ultimate weights attained by mature oxen, viz.: Best one-year-old, weight 1,338 pounds; best two-year-old, weight 1,786 pounds; best three-year-old, 2,139 pounds; and the heaviest 3,190 pounds. The crucial test in every examination being simply the value of the animal for the butcher. The records given below will repay the study, and the reports of the committees, as given, will show the points upon which the several decisions have been made:

The committee on Short-Horn steers, 4 years old and over, make the following report on ages, weights, and gains per day, and add the comments which are appended:

CLASS A—CATTLE. SHORT-HORNS—THOROUGHBREDS.

[TABLE 1].

EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day in pounds since birth.
1. W. W. Penfield	2,035	2,500	1.22
2. W. W. Penfield	2,155	2,438	1.13
3. J. H. Graves	1,948	2,415	1.25
4. Wing & Thompson	1,598	2,166	1.36
5. Wing & Thompson	1,578	2,250	1.42
Average	1,861	2,358	1.28

The committee in their report on this ring say:

The ring was made up of a remarkably fine bunch of well-developed steers; all were uniformly fat, with flesh well distributed in the most valuable portions of the carcass.

The animals reflected great credit upon the States in which they were fed, namely: Ohio, Kentucky, and Illinois.

The first-premium steer was deep red in color, smooth and even throughout, with straight top and bottom lines; broad, deep loin, well filled out; round, smooth, compact barrel; short in leg, with fine bone and small head.

This steer excelled the others in the ring in having more good flesh on the back and loin, with a small portion of cheap, unsalable fat meat, with square, deep, symmetrical quarters, well covered down to the knee and gambrel joint.

The second-premium steer was a deep red steer of superior quality, and in choice condition for the block, and, in the main, as good as the first-premium steer, but was not as free from bunches of fat, especially on the rump.

The remaining steers in the ring, while worthy of special commendation, were coarser and older than the prize-winners, and not as well filled out in the shoulder and thigh, and were patched.

The first-premium steer was the youngest in the ring, and showed the largest average gain per day since birth.

The second-premium steer stood second in this respect.

SHORT-HORNS—THOROUGHBREDS. COWS THREE YEARS OR OVER. REPORT OF COMMITTEE.

The ring consisted of eight cows of unusual excellence as a lot, showing great difference, however, in the matter of age, type, form and mode of handling.

The aged animals were uneven, and carried too large a portion of meat of inferior quality; too gross; some were very badly patched.

[TABLE 2].

No.	EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day since birth.
1.	Dexter Curtis	2,560	2,042	0.70
2.	Dexter Curtis	3,667	1,936	0.52
3.	R. K. & A. S. Brownlie	2,065	1,769	0.86
4.	Sam. E. Prather	2,731	1,833	0.67
5.	Sam. E. Prather	1,186	1,525	1.25
6.	W. F. Gordon	3,064	1,901	0.62
7.	W. F. Gordon	2,241	1,669	0.74
8.	Wing & Thompson	1,428	1,616	1.13
	Average	2,364	1,786	.81

The cows averaged over six years in age, and some were over ten years old. Some of the old breeding cows were very undesirable for the block, and the meat would not be rated as even medium.

The first-premium cow was a deep red and of the lot the finest in bone, head and neck, the smoothest and best proportioned throughout, with an extra well-filled fore and hind quarter. In the great depth and even distribution of solid, mellow flesh, straight top and bottom line, broad back, and thick loin, this cow excelled.

The second-premium cow was somewhat coarser in head and not as smooth or evenly fatted, and rather deficient in back and loin; otherwise as good as the first-premium animal.

SHORT-HORNS—THOROUGHBRED. STEERS TWO AND UNDER THREE YEARS

[TABLE 3].

No.	EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day since birth.
1.	J. N. Brown's Sons	845	1,636	1.93
2.	J. N. Brown's Sons	814	1,449	1.78
3.	A. F. Moore	953	1,786	1.87
	Average	871	1.624	1.86

The committee reported on this ring as follows:

This ring was composed of three very superior steers, showing unusual development and ripeness for age. In size, symmetry, and distribution of meat in the best cuts, they would pay the butcher the most profit, and furnish the consumer with the best quality of first-class meat.

The first premium steer was red in color, had the best back and loin of the three steers, and showed the greatest development for age. Was the smoothest steer, with smaller head and lighter in horn; small, neat, short neck, with the widest and deepest breast; better in width of back and

thicker in loin. This steer was smooth and free from bunches, with firm, solid and mellow flesh. The quarters were heavy and well proportioned and well filled down to knee and gambrel joint. The shortness in leg and the fineness of bone is worthy of special mention.

The second premium steer was a rich roan, not as evenly fatted as the first premium steer—more uneven top and bottom line than the first premium steer.

STEERS THREE AND UNDER FOUR YEARS.

[TABLE 4].

No.	EXHIBITOR.	Age in days.	Weight Nov. 10, 1879.	Average gain per day since birth.
1.	John Sherman	1,311	2,019	1.53
2.	J. H. Graves	1,335	2.060	1.45
	Average	1,326	2,039	1.53 1-2

The committee's report on this ring is as follows:

"This ring consisted of two very superior, well-developed and evenly-matched steers in point of age and weight.

The superior quality of the flesh and the proper distribution of the meat in the best parts of the carcass was particularly noticeable in both steers.

The first premium steer, a light roan, was perfectly smooth and free from bunches, and a good handler. He was straighter on the back than his competitor, with better hind-quarters. This steer was a low blocky, heavy-set steer, short in leg, fine bone, neat head, well cut up under throat, short neck, broad and deep in brisket, broad, straight back, heavy loin, with thick round, well meated down to the knee and gambrel joint.

The meat was firmer and more solid than on the first premium animal, which was fatter, and from all appearances would cut to better advantage and furnish meat of a superior quality.

The second premium steer was an extra well fatted red steer of great merit; was rather more leggy and coarser in head and bone than the other steer."

Profit in Early Maturity.

In the foregoing reports it will be noticed that the best gain was in steer one year old and under two; the next best gain was in steer two year old and under three, 1.93 pounds per day; the next best gain was in steer three years old and under four, 1.54 pounds per day. Then

in following the gain in cows over three years old, the average will be a diminishing quantity, until in the case of the cow ten years old, table 2, No. 12, the daily gain is but 0.52 of a pound; and in the case of the oldest steer, nearly six years old, table 1, No. 2, the daily gain was 1.13 pounds per day. These great results were arrived at by warm shelter, careful feeding, and as careful care from birth—most potent factors in any case when money is to be made in cattle, either for beef or the dairy.

As a rule, a yearling, as it is ordinarily wintered, will weigh much less in the Spring than in the previous Autumn. The next Spring and Summer it must first regain the flesh lost, and then add to growth and weight. The next Winter it again loses flesh, and at two years old often will not weigh as much as it did at eight months old. So it goes on gaining a little in Summer and losing as constantly in Winter, until at the end of the fourth year the animal will weigh 1,000 pounds—less than the same animal would have been made to weigh at eighteen months old with good common shelter and feed. There are cases in new countries where feeding, except hay, cannot be had; where this is plenty, and the range good, cattle may be raised at a minimum cost—simply salting and herding in Summer, and feeding in Winter. Here again the question of shelter must be considered and will be found to pay, and without which no profit can be realized.

This system of feeding, however, is no longer feasible except in limited areas. The great West is fast settling up and increasing in wealth. Herds are yearly improving through attention to breeding and feeding—the result of the cultivation of vast areas in corn, the seeding of meadows and pastures, and in superior buildings for wintering stock. The history of the thickly settled portions must be the history of the newer regions in the future. The profits, in farming in the West, are in the stock sold. Pastures and meadows are the groundwork of good farming everywhere. Thus verifying the Belgian maxim: No pasture no cattle; no cattle no manure; no manure no crops.

Make Beef Young.

The time has gone by when it would be believed that an animal must reach the age of four or five years before it could make good beef. The time has also passed when the mere tallow in an animal would sell it. The reason why we have so little beef fit for export to the English market, and which will bring in Western markets from five to six cents per pound gross weight, is that very few western farmers have adopted the English standard of forcing a calf from the time it is born until it is killed, the age never exceeding three years. This tendency of English breeders and

feeders has been the growth of years. They had first to combat the idea that beef must have age before it could be healthy meat. First, they compromised on three years; the beef was pronounced good. Then the cattle were pronounced at thirty months fully as good and ripe: they also found that they got enhanced profits from this manner of feeding. Then two-year olds were forced to the same weight that had previously been attained at three years. Last year beef from eleven to twenty months was sold, and from an article prepared by Mr. Henry Evershed, for the *Royal Agricultural Journat*, in which the experience of some eminent farmers given, we find interesting matter in relation to very young beef, or, as they term it,

Baby Beef.

Among others, Mr. Stanford, of Charlton Court, is credited with having sold the following heifers and steers in 1878, the animals being high-grade Short-Horns, at ages and prices given below:

	Price.	Return per month from birth.
One eleven-months-old steer	$ 74 00	$6 73
One thirteen-months-old steer	101 64	7 82
Three fourteen-months-old heifers, average	92 40	6 60
Three fifteen-months-old heifers, average	101 64	6 77
One sixteen-months-old steer	102 30	6 39
One eighteen-months-old steer	115 50	6 42
One eighteen-and-a-half-months-old steer	129 36	7 00
Two eighteen-and-a-half-months-old steers, average	122 10	6 60

The weights of these, some of them were calves, is not given, but the price is stated at from 16 to 18 cents (our money) per pound, net weight —meaning, we suppose, the four quarters. The best 16 months old steer must have weighed something like 1,200 lbs. alive, allowing the quarters to have been 65 per cent. of the whole weight—a not very large allowance for such young cattle. In the last Chicago Fat Stock Show, the best steer, 28 months old, weighed 1,636 lbs. The best steer one year old and under two 1,338 lbs., showing that our best feeders not only show fully as early maturity as English feeders, but likewise as wonderfully good weights.

In relation to the English animals mentioned above, Mr. Evershed writes:

"The above figures show that tolerably-bred Short-Horns will return 7*s*. a week from birth on this system, at from 13 to 18 months old. Those Short-Horns which afforded the least return were bought in the market, and those which gave the highest were by Mr. Stanford's pedigree bull, out of his well bred, but not pedigree cows. The best feeders of

country-bred cattle in Sussex and Surrey inform me that they consider a fair average weight for animals, well fed from birth, 100 Smithfield stone at one hundred weeks, giving a return of one stone (8 lbs. dressed weight) per week, or 6s. ($1.32) per week."

Our authority mentions a steer killed that dressed 132 stone at one hundred weeks, equivalent to 1,760 lbs. live weight. Some sixteen months steers dressed, in the quarters, 600 lbs., having 120 lbs. of rough fat, and a very small proportion of offal. He states that the best feeders are able to reach an average of $1.43 per week at sixteen to twenty months, from a Short-Horn cross on common cows.

Feeding—Cost in England.

The English feeder is content with the manure resulting from this manner of feeding stock, if indeed he can get this for his trouble. As to the cost of making what is termed a "baby bullock" of seventy-one weeks, the following is given, reduced to our standard of dollars and cents:

Purchase of calf	$ 8 88
Four weeks' new milk, 6 quarts daily, at 2d per quart	6 16
Eight weeks' skimmed milk, 6 quarts daily, at 1-2d per quart, and 2 lbs. of meal at 1-4d per lb	5 68
Seventeen weeks in June, July, August and September, on a daily diet of 2 lbs. of linseed cake, 2 lbs. bean meal, mangel, hay, grass, clover, etc	17 57
Twenty-six weeks to end of March—5 lbs. of cake and meal daily, 3 4 bushel of roots, hay and straw for fodder	30 27
Sixteen weeks to harvest—8 lbs. of cake and meal daily, mangel, grass, clover—total, $1 59 per week	25 44
Attendance, 71 weeks at 11 cents	7 81
Insurance, interest, and rent of shed	5 54
Total	$107 35

Our authority estimates the value of the manure at 20 per cent. of the cost of the food, $85.12, or value of manure $17.02. His account stands thus:

DR.

A bullock 71 weeks old	$107 35
Profit	17 69
Total	$125 04

CR.

A bullock sold at 71 weeks old	$108 02
Value of manure	17 02
Total	$125 04

Let any feeder take a calf at five dollars at birth, figure the cost of everything fed in raising, new milk, skim milk, oil-cake, and ground food if raised by hand, or the interest on the cow if allowed to run, care,

insurance, etc., it will, if carefully managed, show figures on the right side of the ledger. Unfortunately there is no data to show, but our best feeders for early maturity seem perfectly satisfied with the outcome on steers of from two to three years of age, and probably might be so with younger ones if it were not the fact that animals do so well until three years of age that they dislike to kill them younger; besides, in the West it is found cheaper to grow the cattle rather slowly and give them somewhat longer time. It is a question of cheap food as against labor in the care of cattle in stables, in Winter, and soiling; that is, feeding in stables on grass and other food, artificially prepared, in Summer.

From what we have shown, the reader will come to the conclusion that we are a firm believer in shelter and humane treatment. The facts we have given will, we think, fully substantiate the correctness of these premises. No sensible person will, we think, doubt the soundness of the proposition that the animal should be kept growing during the cold season, when both feeding and shelter are necessary. The object with any feeder is to get the greatest net gain for the food consumed, and in the shortest time.

Under this system of feeding the profit was seen. The humanity lies in the fact that the animals had during their lives the greatest enjoyment that brutes are capable of—that of feeding and quiet rest. The owner has his reward both in a pecuniary and conscientious sense.

Summer Feeding.

It is only within the last few years that our best feeders have supplemented pasturage in Summer with grain. In England this has been done for years. The rational of the matter is this. To keep animals in the highest possible condition, the pastures must be flush, that is, they must produce full feed at all times. Every master-feeder knows this is not practicable during some of the Summer months. The July and August pastures will not carry what the May and June pastures will. Gradually they began to adopt the practice of fully stocking the pastures and giving the animals what grain they would eat in connection with grass. At times they will eat very little, especially when pastures are in their full succulence of young greenness; but a little meal will be eaten every day. The systems of the cattle thus remain in better average condition than when fed on grass only, in Summer, and on hay and grain in Winter. Animals when on succulent pastures require some dry food; they will often eat hay at such times. The meal or soaked corn, if animals are used to it, modifies the succulence of the grass and clover, containing as they do from seventy to eighty per cent. of water. Full grain feeding, with hay

in only small quantities, tends to the creation of unnatural heat and fever. Food ground, and fed moist with considerable hay, obviates this tendency somewhat, and the more the stomach is distended with fodder the less the tendency to fever.

Natural per cent. of Water in Food.

The proportion of water to flesh-forming and fat-forming substance in natural food, (herbage), will range from seventy to eighty per cent. The proportion of water necessary with dry feed may be stated at about sixty per cent. in Winter, and more in Summer, varying with the heat and humidity of the atmosphere. Upon succulent herbage in Summer the animal tissues will contain more fluid than in Winter, on dry food; hence the necessity and economy in Winter-feeding to keep the animals fully supplied with water, so that certain portions of their systems will not be obliged to abstract the natural fluids from other parts of the body. Upon turning cattle to pasture in Spring they often seem to fatten suddenly. Much of this is due to increased assimilation of water in the tissues. The advantage of pasturage in Summer is that it tends to ameliorate the condition of the animal by reducing the feverish state of the system, acquired during the Winter feeding on dry food. Hence the value of roots, where easily and cheaply raised—turnips in England; turnips, carrots, and beets, in the Eastern States; and beets and carrots in the West. In the West, roots are not given so much for their fattening quality; but when these are fed at the rate of one quarter bushel or less per day, they act as a digestive element to the other food, causing more perfect assimilation. When these are not to be had, bran should constitute a portion of the food given.

Animal Waste.

It is generally considered as true that about two-thirds of the food consumed goes to supply the animal heat and waste. All grass-feeding animals that have to sustain themselves for long periods in the wild state, on scanty food, accumulate large masses of fat in the Summer months. During the Winter this is gradually dissipated (consumed) in the effort to keep up the animal heat, and by Spring the animals are thin and weak. Precisely the same thing occurs in the ordinary way of wintering stock on hay out-of-doors. They become thin, often emaciated, and sometimes die, in the effort of the owner to see upon how little food he can bring them through alive. Not only all the food given has been consumed, burned up, in the effort to keep warm, but also all the fat, where accumulated in masses about the body. Not only this; before the animal finally

succumbs, the fat mingled with the muscles and other heat-forming substances, will have been consumed. Yet many persons who consider themselves humane and Christian men, follow this plan year after year. It is true they suffer in purse and in vexation. Is it possible to be supposed that their depleted pockets will compensate for the suffering of the poor brutes under their care? It is hardly a supposable case that it should be so.

Animal Heat.

The natural temperature of the body is 100 degrees. If the temperature go above that it indicates fever; if below it is a chill; either condition, if not counteracted, will be fatal to life. The advantage and economy of full feeding in Summer, as well as in Winter, will be understood when we remember, that, whatever the temperature of the air, the animal heat will be 100. When the temperature will average 60 to 65 degrees, as it will during the season of pasturage, it will require only food enough to raise this temperature by 35 to 40 degrees to bring it to 100. All else the animal eats goes to make weight. If during the Winter the average temperature be 30 degrees, it will require food enough to be eaten to raise the temperature by 70 degrees to reach blood heat and keep up the animal integrity. Here again all food taken in excess of the animal waste is gain. But another integer here steps in. It requires less proportionate food to keep the animal force intact with a high thermometer than with a low one; that is, it requires more than double to supply the waste with the thermometer at 20 than it does with the thermometer at 60.

There is a limit of cold beyond which neither animal nor plant can endure. In other words, when the cold becomes so intense that the capacity of the stomach to digest is counteracted by the animal waste, death ensues. Thus we often hear of whole droves being destroyed, where exposed to the force of strong chilling winds, as the "Blizzards" of Minnesota, "Northwesters" of the plains, and "Northers" of Texas. In a still atmosphere the animals would have withstood a much greater degree of cold, for the reason that they would have carried an atmosphere of heat about them. In the wind the heat was blown away, and in the attempt to supply heat as fast as destroyed the animal economy gave way and refused longer to exert itself.

Advantages of Full Summer and Winter Feeding.

From what we have written the reader will have learned that there is no economy in scant feeding of animals either in Summer or Winter.

The facts are, those feeders make the most money who not only give the warmest shelter in Winter, with liberal feeding, but who carry their stock fully up to the feeding point in Summer. Where corn is as easily raised as it is in the West, many of our best farmers will tell you they can produce an acre of corn for less than an acre of hay. We have cultivated 65 acres to the hand in a field of 1,500 acres, and at a cost of one and one-third days' work for team and man per acre, up to the time of, but not including, the husking.

One advantage of feeding grain the year round is that you may stock your pastures so fully that the grass will be kept evenly grazed, thus enabling you to carry more cattle in Summer on a given area of pasture, and enabling you to produce more corn for Winter feeding. Another advantage is, the animals become fatter, and thus do not lose so much animal heat in Winter. Still another advantage is, you hasten maturity, and thus save interest on capital, insurance and other items of cost.

These facts should be enough to convince the sensible man of the value of high feeding in connection with shelter, aside from the *animus* of this chapter, that the humane feeder—he who treats his animals most kindly and feeds best—is really the one who makes the most money.

CHAPTER VII.

HOW TO BUY AND HOW TO SELL.

THE VALUE OF GOOD CARE. —— ESTIMATING WEIGHT. —— ESTIMATING BY MEASUREMENT.——BUYING TO FEED.——HOW TO BUY BREEDERS.——WHERE GOOD BEEF LIES. —— BUYING FEEDING STOCK. —— ANALYZING THE CARCASS.—— PROPER SHAPE OF WELL-BRED FATTENING STOCK. —— HOW TO BUY.——BUYING MILCH COWS. —— BUYING DAIRY MILKERS. —— MILK MIRRORS. —— THE TRUE VALUE OF MILK MIRRORS.——VALUE OF ESCUTCHEON MARKS.——MILKERS IN ALL BREEDS.——HEREDITY.——DIGESTION. ——RESPIRATION.——SYMMETRY.

The Value of Good Care.

There are very many farmers who, by care and attention to details in feeding their stock, and by kindly treatment, have done so with profit to themselves. They have raised them from calfhood. Let them undertake to buy cattle for feeding their surplus grain and fodder, and they are very apt to overrate the weight and true value of the cattle purchased. One point should always be kept steadily in mind: Never buy an old steer or cow for fattening. They never repay the cost and trouble they give. Thin cattle, ready for grass, if healthy, may give good returns on flush Summer pasture, if bought at the price per pound that you expect to get in the Fall. You will not only get the price of the flesh put on, but the cattle being thin and the muscles dry, your profits will be added to in the fluids absorbed, and the loss will lie with the former owner in making mere frames to be built upon. So animals bought in the Fall in common grass flesh, will increase wonderfully with good feeding and shelter. If you buy at $2.50 per 100 lbs., and so add 200 lbs. in flesh, and sell at $4 per 100 lbs., you not only get $8 for the flesh put on, but the difference between $2.50 and $4, or $1.50 per 100 lbs. on the original weight. That is, you buy steers at 1,000 lbs. each, feed 50 bushels

of corn per head, and sell them weighing 1,200 lbs. average. They cost $25 and sell for $48, leaving $23 as the value of the corn fed and care given. The manure in any country will pay for the care taken; so, your corn will have netted you near forty-six cents per bushel. From this, knowing the cost and price expected when fat, it will be easy to figure on profits, fluctuations and accidents excepted.

Estimating Weight.

An expert judge will estimate from seeing and handling steers often within ten pounds of their live weight. The buyer will always underestimate weight, and in nine cases out of ten convince the inexpert owner that the guess is right; in fact, more than half the time the seller will be convinced that he has the best of the bargain. The only safe way in such cases is for the seller to weigh. Every man who makes a business of fattening cattle should own a proper scale. He may save the cost in a single year. The merchant, the manufacturer and the builder, who work by guess, always end in bankruptcy. The only reason why farmers do not, is, they have that generous bank, mother earth, which never fails to respond, even to indifferent managers.

In weighing cattle note carefully why certain ones weigh out of proportion to others, and study whether the weight is in the prime parts, a broad loin and hips, and good barrel, or in heavy fore-quarters, with thick neck and big head and horns. Study carefully the points as given in detail elsewhere in this book, and as carefully remember them for future use. Thus you may in time become yourself an expert judge of stock. If an animal is to be killed, estimate his weight alive, how much he will shrink in offal and hide. When the quarters are weighed, if the record is not as you expect, examine carefully wherein the discrepancy lies. It is an especially interesting study for the young man, who expects himself to become a breeder and feeder of cattle. If a breeder, he must know how to sell; and if a feeder, he must know both how to buy and sell.

Estimating by Measurement.

Many breeders have rules of estimating the weight by measurements. There is no rule that comes nearer than good guessing, and all guessing should be avoided, especially when the guessing is to lie on the part of the buyer; that is, the seller should avoid trusting to the guess of the buyer, based upon measurement. No two animals will weigh alike according to measurement.

One rule, perhaps as good as any and for this reason given, is to find the superficial feet by multiplying the girth, just behind the shoulder-

blade, by the length from the fore part of the shoulder-blade to the root of the tail. Thus an ox girthing 7 feet 9 inches and measuring 6 feet in length would contain 7 3-4 times 6, or 46 1-2 superficial feet. For cattle grass fat the following is given as the weight per superficial foot:

Girth	less than 3 feet	11 pounds.
"	3 to 5 feet	16 "
"	5 to 7 feet	23 "
"	7 to 9 feet	31 "

Thus the steer as per above measurements should weigh 46.50 by 31, or 1,441 lbs. gross. Under this rule it is usual to deduct one pound in twenty on half-fatted cattle, from 15 to 20 lbs. on a cow having had calves, and if not fat an equal amount. The rule as above stated is of little or no value, except to those having no other means. In taking account of stock, this may come somewhat near the weight. For buying or selling the scale is the only true standard.

Buying to Feed.

In buying cattle either to graze or to feed fat, choose cattle that are young, that is, that will not have become mature before ready for sale. If to be kept a year, three year old past to four year old for natives and Devons, and one year less for Short-Horns or Hereford grades. Buy no overgrown, leggy animals; they are hard feeders. Neither should they be undersized, as this indicates want of thrift. The cattle for money, whatever their breed, are compact, smooth, fine boned, meek-eyed, soft haired steers, with skin of medium thickness; thick through the heart, round barreled, well ribbed, with broad rump, and the twist well down to the hock. Such cattle, whatever their breed, will fatten kindly and the meat will be of excellent quality. So far as age is concerned, the teeth must be the test. In this no person can err who has carefully studied the chart of the teeth in another part of this work.

How to Buy Breeders.

If the intention is to raise beef cattle the same rule will apply as in buying steers. In no case should the cow be more than three years old, and it is better that she never had a calf. In breeding for beef, milk is not the first essential. It is necessary, however, that the dam give a fair amount of milk, since the proper sustenance of the calf is what lays the foundation of the future value of the steer. No calf starved when young can make a valuable cow to breed from, and as is the dam so naturally will be the produce. Whatever is to be the outcome, avoid at

any price a vicious cow, or one with a wild eye or having a dished face. Her progeny will be sure to give you trouble, and will not give you cattle that will fatten to the standard of the picture we give you of Earl

EARL SPENCER'S PRIZE OX.

Spencer's prize ox; given not only as showing what Short-Horns were fifty years ago but as illustrating the terms to be used in describing the various beef points and other outward portions of the bullock.

Explanation.—*A*—Forehead. *B*—Face. *C*—Cheek. *D*—Muzzle. *C*—Neck. *F*—Neck-vein. *G*—Shoulder-point. *H*—Arm. *I*—Gambrel or hock. *K*—Elbow. *L*—Brisket, bosom or breast. *N*—Crops. *C*—Loin. *P*—Hip. *Q*—Rump. *R*—Pin-bone. *S*—Round-bone, thurl or whirl. *T*—Buttock. *U*—Thigh, or gasket. *V*—Flank. *W*—Plates. *X*—Back, or chine. *Y*—Throat. *Z*—Chest.

Where Good Beef Lies.

The prime parts of the ox lie, as shown in cut, from *N* to *R*, thence to *S*, and back to *N*. Between *P*, *Q* and *V* are the primest parts. The second best are between *M*, *S*, *T*, *V*, *W*, and *K*. Between *S* and *U* are valuable pieces for smoked or dried meat. The ribs between *M*, and *S*; the flanks *V*, *W*, and thence to the brisket *K* are good corning pieces. It will be seen that this animal has a very small proportion of offal, and a very large proportion of valuable meat, being full and broad in the loin, thick ribbed, with the rump massive, square behind, and carrying beef below the twist, or junction of the thighs, well down to the hocks.

Buying eeding Stock.

The novice in buying stock should carefully note the shape and make up. To the superficial eye the superior animals when thin will appear worse than the inferior ones; the bony parts will appear more prominent, and for this reason their breadth, when thin, will seem to be exaggerated; this, however, is only apparently so. An animal of no particular character may seem fairly smooth to the eye. Those accustomed to handling stock will know that superficial observation goes for little. The touch is what decides the value of an animal. The well-bred animal carries softer, smoother, and finer hair than the ill-bred one; its breadth from the shoulder to the rump gives it a bony appearance when thin, that in the scrub steer is partly concealed by the higher backbone and coarser hair. We are now speaking of no particular breed, but of all breeds and crosses that have characteristic points enabling them to lay on flesh. The scale of points for Short-Horns will make a good study. The illustrations of fat cattle show what they should be when fat. The picture of the Devon ox will show what a good feeder should look like off of good grass, and may be taken as the type for our best native cattle.

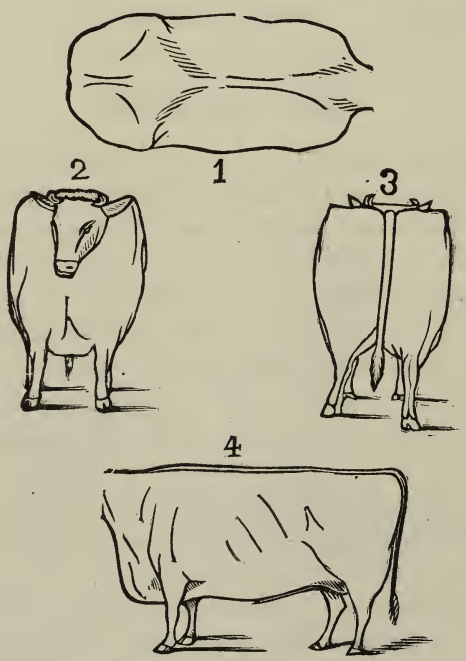
Analyzing the Carcass.

In all first-class steers every part of the animal, except the bones, hide, tallow, and offal, will be good consumable flesh. The roasts, steaks, and corning pieces will be of the best, so that when the four quarters are hung

up there will be no loss except bone. Let us now see what such an ox as we have shown will give. In the first place, his quarters will dress sixty-five per cent. of his gross weight. The loin above *P* and from thence to the top of the shoulder above *N* will give most superior steak and roasting-pieces. The shoulder-point or neck-vein back of *T* and the thigh at *S* make the best smoking-pieces. The plates *W* will make the richest of corned beef, while *R*, *S*, and *L* (the rump, round and brisket) make the best pieces for packing—good thick, juicy meat, and in large quantities. In fact such an animal will convert the food he eats into good beef, and plenty of it.

Proper Shape of Well-bred Fattening Stock.

Cut off the head, neck, legs, and tail, and well-bred beef cattle will present the appearance of an oblong square. Thus there is ample room



OUTLINE OF PRIZE FAT BULLOCKS.

for the legs and viscera through the width of the bosom and spring of the ribs, and this carries corresponding breadth behind, giving a broad loin and massive rump. Such an animal will feed heartily and kindly, satisfy the butcher when brought to the block, and be profitable to the feeder. Above we give four outlines showing animals made very fat, and

cut square to show the shape. There is no profit, however, to the feeder in cattle fattened to obese or immense weights; they are mere mountains of fat, and contain no more lean meat than animals fattened fairly ripe. There are few people who do not like well-fattened beef. Few, however, care to eat any but the lean. An animal, therefore, that is fattened just ripe is the heaviest in muscle, well marbled with fat. This is what the consumer wants, and what the feeder should seek to make. Smooth, fine-horned, medium cattle, according to the breed selected, are what give profits in this respect.

How to Buy.

In buying ordinary (that is native) cattle for pasturing and feeding fat during the Summer and Fall, always buy in the Spring. If the grass is good at the time of purchase, as it should be, no matter how thin the stock, if healthy and hearty. The thin stock will weigh less, and you will have to pay less for it. The loss will be with the farmer who grudges his animals sufficient to eat in Winter, rather than with the buyer. Generally all this class will sell cheaper in the Spring than in the Fall, and as a rule yearlings may be bought for less money in the Spring than the same calves would have brought in the Fall. If they have been fairly wintered they will be profitable to feed; if badly wintered, it will be questionable, unless the price paid is low enough to warrant the purchase. In any event the feeder must usually depend upon buying steers off of common keep. Good feeders are not apt to sell half-grown steers, nor those that one more season's keep will make ripe. The best money-making friends of the sagacious buyer are, after all, those who never read, and will not believe that anything in print relating to agriculture in any of its various departments can be of value. They do not know that as great advances have been made in agricultural art within the last thirty years as in any other industry, and that the best practical talent in Europe, and within the last few years in America, have been earnestly engaged in elucidating and applying practical science to agriculture.

In selecting milking cows the following doggerel verses from an old English magazine are as true now as when written as to what constitutes a cow for both milk and beef:

She's long in her face, she's fine in her horn,
She'll quickly get fat without cake or corn;
She's clean in her jaws, and full in her chine,
She's heavy in flank, and wide in her loin.

She's broad in her ribs, and long in her rump;
A straight and flat back, without e'er a hump;
She's wide in her hips, and calm in her eyes;
She's fine in her shoulders, and thin in her thighs.

She's light in her neck, and small in her tail;
She's wide in her breast, and good at the pail;
She's fine in her bone, and silky of skin—
She's a grazier's without, and a butcher's within.

Buying Milch Cows.

In selecting cows for milk, or heifers from which to breed milking stock the breeder must be guided by the same general principles as in buying beef-making steers. That is to say, the animals must be fine, with mellow though rather thin skin, and mossy hair; the head small, but face straight and rather long; the horns should be fine, short, and if somewhat curved it is a good indication. The eye must be bright and yet placid. The barrel, pelvis, rump and thighs should be roomy; and, for obvious reasons, avoid a dish-faced, and especially a wild-eyed cow, or one with a dull, heavy eye. The first shows viciousness, the last stupidity —both dangerous and both unprofitable.

In buying for milk, the object being to breed your stock, select heifers of three years old ready to come in, provided the stock bulls were suitable; if not, have nothing to do with them. In this case buy heifers of two years old that have never been bred. Then, by attention to what we have said upon breeding, you cannot go amiss.

Buying Dairy Milkers.

When the buyer is selecting cows simply to wear out in the dairy, and without any reference to retaining or improving the breed, all he has to look to is an animal that will give a good flow of milk, and hold the flow for a long period. Many cows will start out with large messes, and at the end of three months will hardly give enough to keep a calf; others will continue in milk for six months; others, again, will continue in milk well up to the time for again dropping a calf. These latter are the cows to buy. Select them according to the rules heretofore given, and of from three to five years old, but not unless they are well along in calf. A dairy cow will continue to improve in her milking qualities until she is six years old, sometimes until she is seven or eight; they will continue to give ample returns until ten years old, and often until eleven or twelve.

Milk Mirrors.

Besides the rules already laid down, there is an infallible sign in the milk mirror— or "escutcheon," as it is now called—in cows, heifers, calves, and also shown distinctly in the bulls of milking breeds. We have studied and bred by it since its first publication in the United States. It is the result of years of study by M. Francois Guenon, a practical

farmer of Libourne, France, and first reduced to a system in 1822. In 1828, at a public test and careful examination by the Agricultural Society of Bordeaux, the committee made an absolute and exhaustive report, in which they used this strong language: "*This system we do not fear to say is infallible.*"

The society decreed Mr. Guenon a gold medal, made him a member of the society, ordered fifty copies of his work, and distributed one thousand copies of their full report among all the agricultural societies of France.

This system was first made known in the United States, if we remember aright, between 1838 and 1840, and has been studied, believed, and acted on by many practical men; yet, curiously enough, it has never attracted general attention until within the last few years, since which time dairying and the breeding of dairy cows has come to be a regular profession. While we should not rely entirely upon the many classes and their variations, including a bastard escutcheon to each class, the signs as given by the author are most valuable in connection with other matters which are given. In the Guenon theory there are twenty-seven cuts or diagrams to illustrate his idea, varying from the fullest development in the growth of hair turned upward, to as near nothing, as is ever shown in the cow, but all having more or less of this peculiar development of hair on the parts named; this hair, to indicate a good milker, should turn upward, be short, fine and close; the skin easily raised, and with peculiar oval marks and scurf spots.

The True Value of Milk Mirrors.

So far as we have studied these signs, we have found them while not constant marks by which the quality and flow of milk could be accurately judged, yet most valuable in connection with other characteristic signs and configurations, which we have given for judging accurately what should constitute a good dairy cow. We have found it a most valuable aid in judging the milking qualities and time of continuance in milk. That in itself it does not constitute an infallible test is no proof of its being an unsound theory. That it is correct, as a rule, is sufficient to cause it to be given careful study and attention.

We do not hesitate to say that he who will study carefully the illustrations we give, and the statements made, while he will find many varying signs, will not only be convinced of the accuracy of the system, but will be able, either in the cow or calf to select with judgment. The milk sign also follows in the bulls as we shall show.

Mr. Charles L. Sharpless, of Pennsylvania, a close observer and good

breeder, in relation to the value of the escutcheon, as seen in Jersey cattle, gives his experience, which we condense as follows:

There is no point in judging a cow so little understood as the escutcheon. The conclusion of almost every one is, that her escutcheon is good, if there be a broad band of up-running hair from the udder to the vulva, and around it.

FIG. 1. FIG. 2.

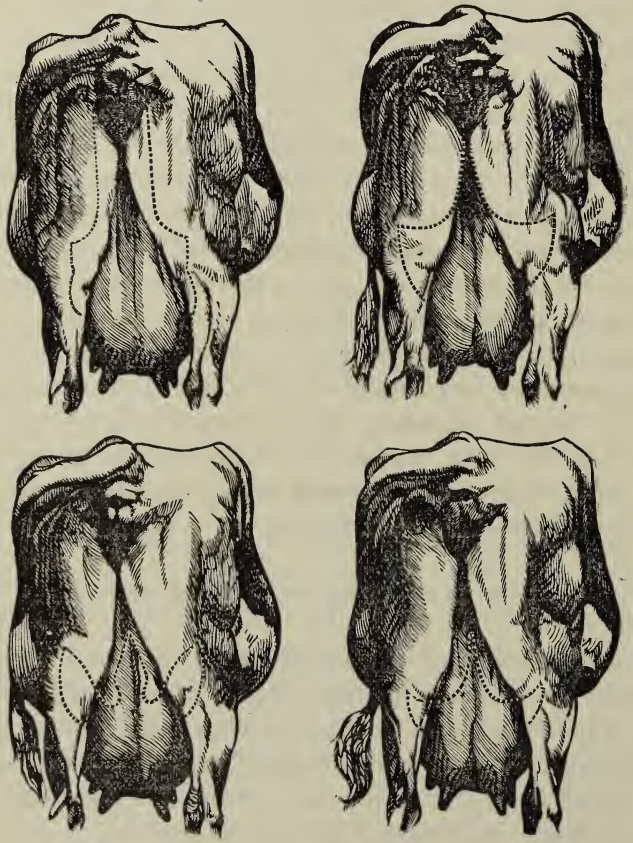


FIG. 3. FIG. 4.

MILK MIRROR OF JERSEYS.

These cows with the broad vertical escutcheon are nearly always parallel cows; that is, with bodies long but not large, and with the under line parallel with the back. Their thighs are thin, and the thigh escutcheon shows on the inside of the thigh rather than on its rear.

Next comes the wedge-shaped cow, with the body shorter but very large, deep in the flank, and very capacious. This form does not usually

exhibit the vertical escutcheon running up to the vulva, but with a broader thigh may exhibit a thigh escutcheon, which is preferable to the other, thus—see Fig. 2.—Milk mirror of Jerseys.

In both vertical and thigh mirrors, where the hair runs down, intruding on the udder (as low as above the dotted lines) as in Figs. 3 and 4, it damages the escutcheon. If you find a cow with the hair all running down, and between the thighs—that is, with no up-running hair—stamp her as a cipher for yielding milk.

There are times when the udder of a cow with an escutcheon like Fig. 4 will be enlarged by non-milking, for the purpose of deception. It is always safer to judge by the escutcheon rather than by the large size of the udder.

The escutcheons of the best cows—those yielding the most and continuing the longest—will be found to be those which conform to Fig. 2.

The vertical escutcheon of Fig. 1 would not injure it; but if that ornamental feature has to be at the expense of the thigh escutcheon, Fig. 2 is best as it is.

Whenever an escutcheon is accompanied by a curl on each hind-quarter of the udder, it indicates a yield of the highest order.

So far, we have noticed only the rear escutcheon, or that which represents the two hind quarters of the udder. The two front quarters are just as important, and should be capacious and run well forward under the body. If the udder in front be concave, or cut up, indicating small capacity, it represents reduced yield.

This front or level escutcheon is distinctly marked in the young heifer or bull, and can be seen by laying the animal on its back. The udder hair under the body all runs backward, commencing at the forward line of the escutcheon. This dividing line is very perceptible, from the fact that the hair in front of it all runs forward towards the head of the animal, while the escutcheon, or udder hair, all runs backward, over the forward quarters of the udder, around and beyond the teats, and ceases at the markings of the rear escutcheon on and between the thighs.

The breadth and extent forward of this front escutcheon indicates the capacity, in the mature animal, of the front quarters of her udder. In some cases this front escutcheon will be found of twice the extent that it is in others, and is evidence of that much more yield.

This examination enables one to see the size of the teats and their distance apart, and to test the looseness and softness of the udder skin. It is marked precisely the same in bulls, and can be easily examined at any age between one and ten months.

Many think that the escutcheon of the bull is of little moment, so that he has a good look. So far is this from being the case, that a bull with a mirror like Fig. 4, or worse, will stamp his escutcheon on, and to that extent damage, his daughters out of cows with escutcheons as choice as Fig. 2. In this way the daughters of some of the best cows come very ordinary, while, if you use a bull marked like Fig. 2, he will make a poor escutcheon better, and will improve the best. His injury or benefit will be doubled according to the escutcheon markings under the body in front of his scrotum. Hence the importance of the dam of a bull being unexceptionable in her udder and escutcheon. Her qualities inherited by her son will be transmitted to his daughters.

GREAT MILK MIRRORS ON HOLSTEIN COW.

While careful as to escutcheons, we must not neglect the other essential features of a good cow—the back, skin, hide, the rich colored skin, and the fine bone. Let the hair be soft and thickly set, and let the skin be mellow. This latter quality is easily determined by grasping between the thumb and forefinger the skin at the rear of the ribs, or the double thickness at the base of the flank that joins the stifle-joint to the body, or that on the inside of the rump-bone at the setting on of the tail. Let the

teats be well apart; let them yield a full and free stream, and be large enough without the necessity, in milking, of pulling them between the thumb and forefingers. And let us ever keep in mind that *the large yielder must be well fed.*

Prof. Magne, V. S., of the Veterinary School, Alfort, some thirty years ago, as to the relations below the escutcheons and the functions of the milky glands, and as differing from M. Guenon in some of the details, gives the following explicit information:

"The direction of the hair is subordinate to that of the arteries; when a large plate of hair is directed from below, upwards, on the posterior face of the udder, and on the twist, it proves that the arteries that supply the milky system are large, since they pass backwards beyond it, convey much blood, and consequently give activity to its functions. Upper tufts, placed on the sides of the vulva, prove that the arteries of the generative organs are strongly developed, reach even to the skin, and give great activity to those organs. The consequence is, that after a cow is again with calf, it draws off the blood which was flowing to the milky glands, lessens, and even stops the secretions of milk.

"*In the bull, the arteries, corresponding to the mammary arteries of the cow, being intended only for coverings of the testicles, are very slightly developed; and there, accordingly, the escutcheons are of small extent.*"

Value of Escutcheon Marks.

After the explanation, which accords very well with all that has been observed, it is easy to comprehend the value of the escutcheons. The more the lower ones are developed, the greater the quantity of milk; but *shape* is of consequence.

Still, whatever be the cause of the relations existing between the production of milk and the escutcheons, these marks cannot furnish data so certain as some have affirmed them to be.

In fact, the quantity of milk, and its quality, do not depend solely on the form and size of the escutcheon; they depend on the food, the particular management, the climate, the season, the temperament, the size and energy of the principal internal organs, the capacity of the chest, the influence of the generative system, etc. All these circumstances cause the quantity of milk to vary, without making any change on the extent of the escutcheon; consequently, it is impossible that the same relation can always exist between the escutcheons and the quantities of milk. We often see cows equally well shaped, having exactly the same escutcheon, and placed under the same hygienic conditions, yet not giving equal quan-

tities, or equal qualities of milk. It could not be otherwise. Assuming that a given tuft has the same value at birth, it cannot be the same in adult age; since, during life, an infinite number of circumstances occur to diversify the activity of the milky glands, without changing the figure or size of the tuft.

Is it not sufficient to refer to the inequality of milk given by the same cows, according as they have had one, two, or three calves, in order to make clear that M. Guenon has assigned too much value to the mark which he has discovered?

It often happens that two horses, having exactly the same constructure, and the same external forms, have not the same energy, the same fitness for work. The difference is owing, evidently, to the temperament, and the activity of the principal external organs; in other words, to conditions which it is often impossible to estimate by any direct method.

Now, seeing that temperament has an influence on muscles and bones, the action of which, however, is partly mechanical, resembling that of a lever, and exerts this influence so powerfully as to render their movements unequal in respect both of power and promptness, can we suppose that it has no influence on the entirely vital, or, at least, the entirely molecular working of the mammary gland?

It might, therefore, have been argued *a priori* that the mathematical precision assigned to a classification of cows is contrary to the most general laws of physiology; to propose a mark indicating that a cow will give so much milk daily, and for so many days, is to deceive ourselves, or to attempt to deceive others: the study of the phenomena of life proves that the action of the organs depends not merely on the size and their form, but on the general condition of each individual

We are able not only to oppose argument to the assertion of M. Guenon, but we can appeal to the difficulties hitherto experienced in applying his classification to practice. *M. Guenon has not yet found a single pupil worthy of him.* And among the thousands of persons who occupy themselves with his method, is there a single one who has acquired sufficient skill to justify the claims which the author makes for it?

It may be affirmed that, to form pupils *as skillful as himself* in judging of cows, M. Guenon would not only have to teach them that a certain figure for the tuft corresponds to a certain number of pints of milk, but he would have, above all, to communicate to them his perspicuity, his talent for observation, and his great experience; he would, in fine, have to fit them for estimating, in addition to the direction of the hair of the twist, the whole of the marks usually employed in making choice of milch cows.

All the attempts made on the Guenon method, not excepting those of

the author himself, prove the soundness of our opinion. The most skillful, when called to decide on the qualities of cows, whose yield of milk was well known, erred seven times on eight cows, and fifteen times on twenty-one. And, lest these errors may be attributed to chance, on account of the small number of cows submitted for trial, we should mention that other estimates proved erroneous 152 times on 174 cows, and 321 times on 352, and that the error amounted to 921 pints of milk on a total of 2,683 pints; in other words, there was error in regard to almost all the cows; and error amounting on an average, on each, to more than a third of the yield. On some individuals the estimates were wrong to the extent of from 17 1-2 to 21, and even from 26 to 28 pints a day.

Such is the truth as to the perfect nicety claimed for the escutcheon system. The system cannot do more than furnish an *approximate* estimate of the quantity of milk, and that in regard not to all, but only to the majority of cows.

What, then, has led so many persons to put confidence in M. Guenon's discovery? The great talents and knowledge of the author. The system has obtained the credit due to the experience of him who applied it.

By his discovery M. Guenon has rendered great service to agriculture; the escutcheon has the advantage of furnishing a mark which can be easily discerned, and estimated even by persons of no great experience in the selection of cows—a mark perceptible on very young animals, *and on bulls* as well as heifers—a mark which, when disencumbered of the complicated system in which it has been wrapped up will be in common use and facilitate the increase of good cows, by not allowing any but those of good promise to be reared.

Milkers in all Breeds.

Professor Magne also gives the following concise directions in relation to choosing a good cow, where he says:

"We find good milkers in all breeds, but they are rare in some and very common in others. It could not be otherwise. Milk properties, depending on the conditions which determine the formation of breeds, are due partly to the climate, the soil, the air, and the plants of the countries where the breeds have originated; and must therefore vary in our different breeds of horned cattle, with the hygienic conditions peculiar to each locality.

"Milkers, and more especially animals intended for breeding, must be selected among breeds celebrated for abundance of milk. Not that we can hope to import into our department, with a dry and warm climate

all the qualities of the excellent milking breeds possessed by countries in which the soil is fertile, the air moist, and the sky often cloudy; but as the influence of climate, though very marked, takes effect only in the long run, the properties of the animals imported are maintained—though subject, doubtless, to gradual deterioration—during a period which varies with the precaution taken to preserve them; and for several generations the descendants of a good imported breed give more milk than individuals belonging to a breed found on the spot, where hygienic circumstances are not favorable to milking properties.

It is not to be forgotten, moreover, that under the influence of particular circumstances, which it is sometimes impossible to call into existence, animals manifest properties which we cannot produce directly. This explains why it is often more advantageous to import qualities possessed by foreign stock than to try to develop them in native stock.

As milking qualities are in a great measure dependent on structure and temperament, which are more or less hereditary, descent exercises a great influence.

Heredity.

In each breed, therefore, we should choose individuals belonging to the best stocks, and the offspring of parents remarkable for their milking qualities; for it is certain that good milch cows produce others which resemble them.

But it is especially necessary when selecting stock for the purpose of breeding milch cows, that particular care should be taken to select individuals belonging to good families. A cow of a bad milking family, or even breed, may occasionally be an excellent milker, and more than this is not wanted when it is not meant to breed from her. The same cannot be said when breeding is intended, because there would be little chance of her transmitting the accidental or exceptional qualities possessed by her; whereas the qualities forming the fixed and constant characters of the stock would almost to a certainty be transmitted to descendants.

These remarks, with regard to breed and parentage, apply to the selection of the bull, which, as experience demonstrates, acts like the cow in transmitting the milking qualities which distinguish the breed and stock.

Digestion.

The digestive organs have a great influence on the exercise of all the functions, and particularly on the secretion of the milk-glands. Where the digestive organs are defective, good milch cows are rarely met with.

Good digestive organs are known by a belly of moderate size, with

yielding sides, free from tightness, (in aged animals the belly is often large, though the organs which it contains are in good condition); a large mouth, thick and strong lips, a good appetite, easy and quick digestion, glossy hair, supple skin, yet firm, and somewhat oily to the touch. Animals possessing these characteristics may be expected to feed and drink heavily, and, if they are properly fed, make much blood, and yield large quantities of milk.

Respiration.

The respiratory organs complete the system of nutrition. The lungs bring the air breathed into contact with the blood, and render the system of nourishment complete. Hence, a good form, quick digestion and a healthy condition of the lungs are necessary to the production of a large flow of milk.

Milk Veins.

If the veins which surround the udder are large, winding, and varicose (dilated at intervals), they show that the glands receive much blood, and, consequently, that their functions are active, and that the milk is abundant. The veins on the lateral parts of the belly are most easily observed, and all authors decide them to be among the best tests for ascertaining the activity of the glands.

These veins issue from the udder, in front, and at the outer angle, where they form, in very good cows, a considerable varicose swelling. They proceed toward the front part of the body, forming angles, more or less distinct, often divide towards their anterior extremity, and sink into the body by several openings.

We can make the size of the milk veins prominent by compressing them in their passage, by pressing them at the place where they penetrate into the body. If we press the thumb strongly into the opening through which the vein passes: the width of the opening represents the diameter of the vein, and the thickness of the thumb which stops it, represents the volume of blood whose place it occupies. Sometimes the veins are divided. It is then necessary to examine all the openings by which they pass, in order to form a correct estimate.

Veins of the Udder and Twist.

The veins of the udder and twist are able to furnish valuable indications. They should, in both cases, be highly developed, large and varicose; that is, appear swollen and knotty. The veins of the udder have

no definite direction. They present themselves irregularly, with zigzag lines, knotted, and more or less oblique. They are never of very large size, except in cows that give large quantities of milk.

The veins of the twist directed from above downward, forming a winding line, interspersed with knots, resemble those of the udder in not being visible either in heifers or in cows of only fair milking quality. We cannot ascertain their presence in any but very good cows.

Of all the marks of abundant milk secretion, the best, and in fact the only infallible marks, are furnished by the veins of the twist and of the udder. To estimate them correctly it is necessary to take into account the state of the cow in respect to flesh, the thickness of skin, food, ability to stand fatigue, heat; all the circumstances, in fact, which cause variations in the general state of the circulation, and in the dilation of the veins. It is necessary, moreover, to recollect that in both sexes all the veins are larger in the old than in the young; that the veins which encircle the udder are those which, if the cows are in milk, vary most according to the age of the animal. Small when the animal is young, they continue to increase in size until after the cow has had several calves, when they come to their full development.

This proportion between the size of the veins and the milk secreted, is observed in all females without exception. The size of the veins and their varicose state being due to the blood attracted by the increased activity of the milk-glands, is not only the sign, but also the measure, of this activity—this connection. In fact, this connection is so close that, if the glands do not give an equal quantity of milk, the larger veins are on the side of the udder which gives the largest quantity.

The length of time during which milk is given corresponds with the activity of the organs which supply it. Cows which give most milk a day, also give it the longest; and hence, if no special mark is perceived, we can judge much of the duration of milk by the marks which determine its quantity. It may therefore be accepted that as a rule an abundant milker may be expected to give a long continued flow of milk.

Judging Age by the Teeth.

For the reason that the age of cattle can only be approximately judged by the horns, and in consequence of the liability to error, and especially the doctoring of the horns by the use of the file, sand paper and oil, we give a chart, showing from the cuts presented, the ages of cattle, from birth until they are five years old, when the teeth are fully developed, and also the appearance of the teeth at ten years of age. Thus at birth, it will be seen, there will be but two central teeth, *figure* 1; at two weeks it will have four teeth, *figure* 2; at three weeks it will have six teeth,

figure 3; at a month old the jaw will contain eight incisors, and present the appearance as in *figure* 4. The mouth is then called full, as containing the ultimate number of incisors. These are not permanent, but temporary, or milk teeth, as they are called. At six to eight months old the central teeth begin to be worn, and show smaller than the others, see *figure* 5. At ten months absorption and the widening of the jaw will have carried the two central teeth still farther away from each other, and two other teeth, one on each side, will have begun to diminish, in fact will have distinct spaces between them, see *figure* 6. At twelve months absorption will have continued to two more teeth, leaving intact only the two outside teeth, *figure* 7. At fifteen months the whole of the teeth will present the appearance as seen in *figure* 8. At this time the true or permanent teeth will have been growing in the jaw, between and back of the milk teeth. *Figure* 9 shows the appearance at fifteen months of age, the two permanent central teeth appearing in the place of the two first milk teeth which have disappeared, and the other permanent teeth are shown in their several stages of growth. *Figures* 10, 11 and 12 show the teeth at two, three and four years past. At the age of five years the animal will have a full mouth, as shown in figure 13, and at ten years the incisors will present the appearance as in *figure* 14.

Thus any person by the use of the chart, and by examination of the teeth of cows, of ages known to correspond therewith, may easily become an accurate and prompt judge of the age of cattle, up to the age of four years. It will be seen, however, that in the four year old mouth, the two central pairs of teeth are beginning to be worn down at the edges, and in a flat direction, or inclining slightly to the inside; yet the animal has not a full mouth—that is, the incisors are not all fully up until it is five years old. See *figure* 14.

At five years old the teeth are all fully grown, and the peculiar mark on the teeth, called the cup, is shown in all. At the same time all will have become flattened, while on the two center ones there begins to be a distinct darker line in the middle, bounded by a line of harder bone. From this time on we may depend both on the incisors and the grinders. At six years old the animal will have acquired the last grinding tooth. This is the sixth molar and is, from the beginning, a permanent tooth. From this time until the eighth year, and indeed thereafter, in determining the age of the animal, the nature of the soil upon which it has been fed must be taken into account. Gritty, close fed pastures will wear them faster, and flush pastures slower. Thus in all the pasture regions of the West, and Southwest, the wear will be light. As a general rule, but admitting of many exceptions, at seven years old this line is becoming broader and more irregular in all of the teeth; and a second and broader,

and more circular mark appears within the center of the former one, the most distinct in the central, or two central pairs—and which at eight years has spread over the six central incisors.

At eight years, a change takes place which cannot be mistaken. The process of absorption has again commenced in the central incisors; it is slow in progress, and is never carried to the extent seen in the milk teeth, but is sufficiently plain, and the two central teeth are evidently smaller than their neighbors. A considerable change has also taken place on the surface of the teeth; the two dark marks are worn into one in all but the corner teeth.

At ten the four central incisors are diminished in size, and the mark is becoming smaller and fainter, as shown in *figure* 14. The six central incisors are smaller, and at twelve, all of them are very considerably diminished; but not to the same extent as in the young animal. The mark is now nearly obliterated, except in the corner teeth, and the inside edge is worn down to the gum.

From this time on they continue to diminish in size, and it is difficult to accurately determine the age. In fact except in the case of valuable blooded cows, bulls, or extra trained wosk oxen, and occasionally extra milkers in the dairy, few steers are now kept in the West past six years old, and few cows over nine or ten years of age.

CHAPTER VIII.

THE DAIRY.

RUSHING INTO NEW INDUSTRIES. —— THE IMPORTANCE OF DAIRYING. —— ESTIMATED PRODUCTION OF BUTTER AND CHEESE. —— CONDITIONS NECESSARY TO DAIRYING. ——HOW TO BUILD. ——SUB-EARTH VENTILATION. ——CARE OF MILK, TEMPERATURE. ——VARIOUS METHODS OF RAISING CREAM. —— MAKING DAIRY BUTTER. ——SALTING BUTTER. —— WASHING OR WORKING BUTTER. ——PACKING BUTTER. —— PREPARING PACKAGES —— KIND OF SALT TO USE. —— CHEESE MAKING. ——CHEDDAR CHEESE. ——CHESHIRE CHEESE. ——HOW TO SELL BUTTER. ——UTILIZING WASTE PRODUCTS.

Rushing Into New Industries.

The impetus given to dairy farming within the last ten years, caused by the increasing export demand, and the large price which superior products both of butter and cheese brought in the markets at home and abroad, caused many persons all over the West to rush into the business, supposing that flush pastures and cheap grain were the sole conditions of success. Unscrupulous persons also made cheese of skimmed milk adulterated with oleo-margarine. Butter makers adulterated their products with oleo-margarine, and extensive factories East and West, backed by large capital, entered into the manufacture of oleo-margarine; vast quantities of which were sold as butter. In addition to this many persons supposed it was only necessary to stock their farms with cows, milk them, secure the cream, churn it, salt the butter and thus get rich. The result was, the markets were glutted with grease butter and skim or grind-stone cheese, as they were aptly termed, causing the degradation of really good cheese of American make in the English market, for the reason that the markets being flooded with dishonest cheese, and the industry being in its infancy here, but few makers had established a reputation, considered

good beyond doubt in foreign markets. During 1878, especially, the price of cheese went so low as to cause much money to be lost in its manufacture. The consequence was, many, who went into the business hastily and with few natural facilities for the manufacture, or knowledge of the business, as hastily went out of it. In 1879 a reaction took place, and both butter and cheese during the latter half of the year again paid the manufacturers large profits. These variations are not peculiar to this business alone, but they belong to every branch.

The Importance of Dairying.

Within the last ten years, Ohio, Michigan, the northern half of Indiana and Illinois, southern and central Wisconsin, central Iowa, and later some portions of Missouri, Kansas, and Nebraska have become great butter and cheese producing States, and the premiums awarded to Wisconsin, Iowa, and Illinois for dairy products at International and Inter-State fairs, show conclusively that there is plenty of territory in the West, where the conditions are of the highest order for the manufacture of first class butter and cheese.

As showing the worth and importance of this industry in the West, we need only show the receipts and shipments, at two principal markets, Chicago and Milwaukee, the first for butter from 1869 to 1878, inclusive, and Milwaukee for butter and cheese for the year 1878. That of Chicago was as follows:

Years.	Receipts. lbs.	Shipments. lbs.
1872	14,574,777	11,497,537
1873	22,283,765	12,851,303
1874	28,743,606	16,020,190
1875	21,868,991	19,249,081
1876	33,941,572	34,140,609
1877	42,236,366	36,514,983
1878, Aug. 24,	31,714,318	29,263,586

For the regular butter season—May, June, July and to August 24, 1878, inclusive, the receipts have aggregated 21,414,520 pounds, against 16,493,031 pounds for the same time 1877—an increase of 4,921,489 pounds. The shipments for the same period—May to August 24th inclusive, aggregated 19,821,660 pounds, against 14,495,864 pounds for the corresponding time in 1877—an increase of 5,325,796 pounds.

In Milwaukee the receipts for 1878 were:

Receipts of Butter	6,111,286 lbs.
Shipments of Butter	5,739,041 "
Receipts of Cheese	13,256,808 "
Shipments of Cheese	12,865,110 "

The exports of butter and cheese from the United States, and value, for 1877 and 1878 are given by the Chief of the Bureau of Statistics at Washington as follows:

		1878.	1877.
Twelve months ending Dec. 31,	butter, lbs.	26,656,198	23,014,268
" " " "	cheese, lbs.	139,249,276	112,567,354

Estimated Production of Butter and Cheese.

The value of land and cows in the United States employed in furnishing milk, butter, and cheese, is not less than $1,300,000,000, or the sum of nearly half the national debt at its highest point. Over three thousand factories are engaged in the manufacture of these articles.

The production of cheese is estimated at 350,000,000 lbs. per annum, and of butter about 1,500,000,000; of the former, 130,000,000 lbs. will be exported this year, and 25,000,000 lbs. of the latter. The value of the two is about $350,000,000 or $50,000,000 more than the wheat crop of the country; three times more than the oat crop; four times more than the potato crop; one-seventh more than the hay crop; one-third more than the cotton crop, and but one-fifth less than the corn crop. The number of cows in the United States is over 13,000,000, which is six times the number in Great Britain, over twice the number in France, two and a half times more than in Prussia, and more than in the countries of England, Ireland, Scotland, Wales, Denmark, Norway, Sweden, Russia, Finland, Austria, Hungary and Switzerland combined—although these countries together contain four times the population of the United States. The proportion of cows to the inhabitants here is twenty-three to each one hundred persons.

The production of cheese and butter increased thirty-three per cent. in 1877 and the exports have been in like proportion.

The cheese and butter exported in 1878 have paid freight to the amount of over $1,000,000 to the ocean commerce, or a sum almost sufficient to support a line of ocean steamers. These articles pay to the railroad companies over $5,000,000 annually for transportation, and the article of milk pays nearly as much more. Loaded on railway cars, ten tons to each car, the butter and cheese produced in the United States in one year would fill 22,000 cars, and make a compact line 135 miles long.

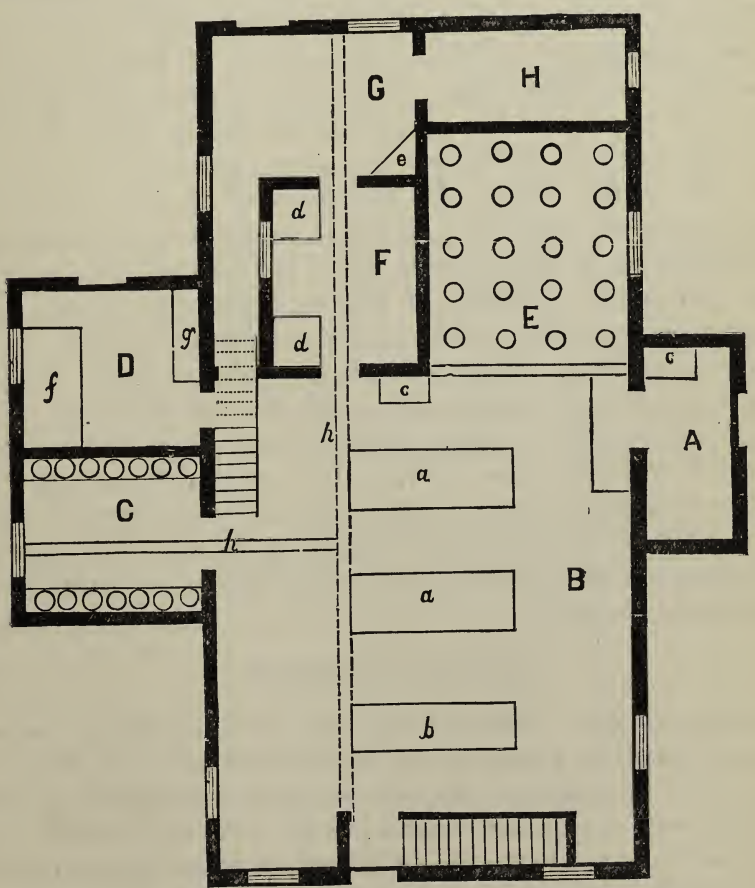
It is estimated that Great Britain, with a population of 32,000,000, consumes about 260,000,000 pounds of cheese annually, while the United States, with 50,000,000 inhabitants, consumes about 200,000,000 pounds annually. It is claimed that when only a good quality is put into the home market Americans will become as great cheese eaters as Englishmen.

Conditions Necessary for Dairying.

There are three natural conditions necessary for the successful prosecution of dairying: abundance of pure water, plenty of grass and cheap grain. There are also three essentials in its manufacture without which no person can succeed. These are, good cows, proper buildings and fixtures, and absolute cleanliness, from the stable to the package in which it is sold. Of course a thorough knowledge of the business must be possessed or acquired. If the dairy is conducted on the factory, associated, or co-operative system, only one person, the superintendent, need be an expert. Cold water is absolutely essential. In the West recourse must be had to ice for cooling purposes, except for the family dairy, and it is better there. The great drawback to dairying in the West has been the absence of cold springs and spring brooks. Deep wells, with windmill pumps, fully supply this need when there is an abundant flow beneath the surface, and when there is not, ice is used for cooling purposes. In fact, no large dairy, where butter is made, is complete without an ice house of sufficient capacity, not only for cooling the milk, but also, to afford cold storage for butter. Whatever the size of the dairy, whether large or small, no person can make money in the manufacture without facilities so that the temperature of the milk and butter can be kept at 60 degrees or less. It is not our purpose to enter into details as to the minutia of dairy work on a large scale. The person undertaking the business must employ a competent dairyman as superintendent. The owner will have plenty to do in attending to the farm, the business details of manufacturing, shipping, selling, etc. To enable those having good facilities for the business to get an idea of the building, we give an illustration showing ground plan of model creamery.

The cut given is a model in every respect, not only in arrangement, but in cheapness. The main building is two stories, 52 by 26 feet, with two annexes as shown, and cost all told, including all the fixtures and apparatus, only $2,500, the building itself costing $1,800. The arrangements are made with special reference to economy of space, labor and travel; to securing an equable temperature, and to the isolation of the cream and butter from odors that may arise in the manufacture or curing of cheese. The walls have three air spaces, one between the clapboarding and sheathing, one between the sheathing and building paper, and one between the building paper and plastering, thus making most perfect isolation. The windows are double. The milk, as received and weighed, is strained directly into the cheese vats, or into the deep cans, for the pool. This is about 20 inches deep, and is made by laying a brick wall to that height, and cementing it on the inside. It is supplied with water

from a well near the rear of the building, pipes being so arranged that the steam-pump can deliver either hot or cold water or steam where needed. Ice is used for this pool as needed. The press-room joins the manufacturing-room, and from the door of this a stairway leads to the curing-room, which occupies nearly all the second floor; the front stairway leading to an office and to a bed-room for the attendant, in front of the curing-room, which is designed not only for the cheese made here, but as a curing and storing-room for that from several factories in the vicinity. The cheese is delivered, as sold, from a door in the rear of the curing-room.



GROUND PLAN OF MODEL CREAMERY.

Explanation—*A*—Milk receiving room. *B*—Cheese manufacturing room. *C*—Press room. *D*—Engine room. *E*—Pool. *F*—Cream and churning room. *G*—Butter working and delivering room. *H*—Refrigerator. *a a*—Cheese vats. *b*—Curd sink. *c c*—Wash vats. *d d*—Churns. *e*—Butter worker. *f*—Boiler. *g*—Engine. *h h*—Whey drains.

It will be seen that the cream and churning-room *F* is a separate enclosure within the main building, and which may be entirely enclosed from the main room, so that when the cream is placed it may be entirely isolated and kept so until churned and stored in the refrigerator. Those contemplating erecting a creamery cannot well improve upon this plan, one of the most modern known, except it be in some minor details to suit local wants.

How to Build.

Where the drainage is good the lower story may consist of a basement sunk three feet into the ground, of stone or brick, and it will be better if the whole building be of brick. The system of drainage should be mapped out, and a chart made. The drains should be laid in the most perfect manner, and with fall enough so they will not clog. Besides the factory drains leading to the waste vats, there should also be tile drains to carry off surface water. The foundation of the floor of the factory should, if possible, have a thin coating of tin shavings, or broken glass, say six inches thick well pounded down, and covered with water lime cement. Upon this a flooring of flags or bricks may be laid, covered with cement of water lime, which in time will become entirely hard, and the tin or glass below will prevent all burrowing of rats. The pipes, leading to and from the cisterns, etc., should be placed before the floor is laid, and the mortar carefully fitted to them. The ice-house should be plastered with water-lime, and a little vacancy left between the ice and the bottom of the house, to allow the water a small space. The top and side walls of the dairy-house should be finished with plaster, by which means a uniform temperature, indispensable to curing cheese, is more perfectly secured.

Sub-Earth Ventilation.

Of late years Mr. J. Wilkinson has advocated a system of sub-earth ventilation, simply by a six-inch tile, laid six feet deep and 300 or more feet long from the building. Two of this length,—or better, one of twice the length, with a wing, and vane connected with the out-door end, to catch air and convey it to the tile—will keep the basement well ventilated, and of the earth temperature of the depth at which the tile is laid.

Care of Milk.

The first requisite is absolute and unqualified *cleanliness*. We have already given directions as to cleaning animals before milking. The least

slovenliness in the help, in this respect, should be severely reprimanded, and if this does not avail, discharge him, or her, at once; it is as necessary as kind treatment of the cows.

If the milk is set in shallow pans, see that there is good ventilation to the dairy rooms, and that the pans are regularly scalded, and with hot, *bubbling* water—slight scalding will not do. Wipe dry, and sun, when possible. Allow no bad odors to accumulate near by from garbage or other causes. For this reason the family dairy should never be in the house, since the steam and odor from cooking, the dust from sweeping, etc., will taint the milk, cream and butter. English dairy women are many of them so particular that they will not allow the men who carry the milk from the yard to enter the dairy house. It is poured into a receiver outside and conducted in through a pipe, regularly scalded each time used, and covered tight from dust.

Modern Home Dairies.

One plan of setting milk is by the "Hardin system." By this system the milk is strained, immediately after being drawn, into deep pails and covered with a well-fitting lid, to exclude both air and water. It is then placed in a refrigerator, with ice above it. The drippings fall upon the pails of milk and form a pool of water, in which they are allowed to stand.

When a cold spring of running water can be had the milk may be immersed in deep open pails, in the cool waters. Unfortunately, in the West, springs are scarce.

Another excellent plan for small dairies is that known as the Cooley system, setting the milk in deep cans; a medium sized refrigerator box, containing space enough for from ten to twenty cows. These cans have close fitting covers, and are surrounded by ice cold water, and thus, if the heat and animal odor be expelled before putting in, there is no tainting or souring. The cream is taken perfectly sweet, in from twelve to twenty-four hours. It is very compact, and may be economically used even in small family dairies, of from ten to twenty cows, if the farmer cares to pay the royalty, the system being patented.

Animal Odor.

Expelling the animal odor is most important. To do this the milk is poured into a receiver, in the bottom of which are a few small holes, through which the milk is allowed to drop into a tank, large enough and high enough to catch all without spattering. This tank stands in cold water nearly to its brim; in this the milk may remain about fifteen min-

ates, when it may be set in any of the ways we have mentioned. An other plan is to heat the milk to 100 or 110 degrees and then allow it slowly to cool.

Temperature.

Good butter can be made, if the temperature of the dairy-room does not go above 60 degrees. This is the proper temperature for churning and working the butter. The temperature for milk may be much lower; it should not be higher from the time the milk is brought in until the butter is carried away. So far as storing the butter is concerned, if the temperature be kept at 40 degrees, so much the better. This, however, cannot be done without ice.

Various Methods of Raising Cream.

G. C. Caldwell, Professor of Agricultural Chemistry, in Cornell University, located at Ithaca, N. Y., in relation to some European methods, says:

"Among the different systems prevalent in Europe, we notice the *Dutch* method in which the milk is cooled down to 60 degrees in a water tank, which requires usually from one and a half to two hours, and the milk is then set to the depth of four or five inches in a room where the temperature ranges from 54 to 60 degrees, and remains about twenty-four hours; the *Holstein* method, in which the milk is set at about the same temperature, without being first cooled in water, to the depth of one and one-half to two and one-half inches; the *Devonshire* method, described as long ago as 1784, where the milk is put in a cool room, standing at a depth not greater than from three to four inches for twelve hours; the vessel containing it is then set over the fire and heated till blisters begin to appear in the cream, or to about 200 degrees, when it is set aside again for twelve hours; the cream is very firm in consistency and can be made into butter by simple kneading, and has a sweet, pleasant taste. Mueller states that the skimmed milk does not retain more than one per cent. of cream; the Gussander method makes no account of temperature, except that it shall not exceed 61 degrees, so that no milk cellar or but only a light, dry and airy room is required; the milk is put in large shallow pans, filling them to the depth no more than from one to one and one-half inches; the milk is skimmed after twenty-three hours, in such a thin layer the milk is so well ærated that it remains sweet to the end, and the cream is sweet and very rich in fat."

These various experiences should be very suggestive.

Making Dairy Butter.

Mr. C. C. Buell, one of the makers of high-caste dairy butter in the West, stated his mod as reported by the Secretary of the Illinois Dairyman's Association:

"Cows were common stock—Durham grades and sprinkling of Jersey. Fed by running in fresh corn stalks during day time, on timothy and clover at night in stable, with two messes of meal daily, consisting, by measure, of two parts corn and one part oats, together with the greater part of the sour milk and buttermilk from the dairy room. Number of cows, forty. The milk was strained through an iron strainer into deep pails, as soon as drawn, standing in open air until the milking was finished. It was then strained again into the same pails through a double thickness cloth strainer. The milk was set in a room without fire, temperature being between 40 and 50 degrees, Fahrenheit. During a part of the time, the temperature being above 50 degrees, the milk was set in water for twelve hours. The milk was skimmed after standing twelve to forty-eight hours, it being considered desirable to mix the newer and older cream, for the sake of flavor; but the whole stood mixed together from two to four hours after the last skimming and during the process of warming to proper temperature for churning. Most of the milk was skimmed a second time, the cream being included in succeeding churning. The churn (a dash churn with solid dasher, surface underneath concave), was started at a temperature of 62 degrees; as the buttermilk began to appear a couple of gallons of tolerably strong brine was added at a temperature of 58 degrees, and the churn stopped a moment afterward,—as with the addition of the brine, *at the proper temperature*, the butter separates very rapidly. As much brine as necessary was used in washing down sides of churn, cover and dasher. The butter was then dipped into a bath of not more than two gallons of brine; a churning of forty or fifty pounds being washed in four parts, in the same brine. Removed to a worker with rolling lever; the butter was so handled as to mix with the proper amount of salt with the least working possible. It was then placed in a tub slightly packed, covered with brine and allowed to stand three or four hours, when it was again placed on the worker, lightly worked and packed for market."

Care of Milk.

We have given the modes of some of the best butter-makers in the world. Now the principal points to be observed are: warm shelter, perfect quiet, for the animals, absolute cleanliness in all operations connected

with the milk, from the time it is drawn until it is made into butter. Just as the butter is forming in little granules, suddenly reduce the temperature to 56 or 58 degrees, so the butter will not mass together. It should never take less than half an hour to churn; quicker churning causes the butter to come salvy.

Coloring Butter.

The best coloring for butter is plenty of succulent grass in Summer, and rich feed in Winter. For home consumption we should never color butter. For sale it may be advisable. If so, use any of the pure preparations of annotto. It is perfectly harmless. If used, stir it in the cream. As to quantity, this cannot be stated. It will vary with the season. Every person must experiment, only do not use too much.

Salting Butter.

Take the butter from the churn in its granular state, and salt at the rate of two-thirds of an ounce to the pound of butter. Do not work it more than enough to fairly distribute the salt; and this by folding and pressing; let the grains of salt dissolve. It may stand from 12 to 24 hours before being worked the last time. Butter, through all the time and process of working, from the time it is churned until packed, should be kept in a pliable, waxy condition, about 60 degrees Farenheit is right, so as to work easily, and the salt all the time be in a dissolving condition. It is utterly impossible to work butter well that is operated upon while either too warm or too cold, or that is allowed to become so between times of working. The benefit derived by standing after the first salting, awaiting the second working, is to dissolve the salt by the moisture in the butter, and so set the butter-milk free, that it may be the more easily pressed out. The amount should not be more than will dissolve entirely, and this moisture should be well worked out before adding more. After this add salt sufficient to season to your taste, working to mix it evenly through the butter; then leave it there to cure and preserve.

A good average is about one ounce of salt to a pound of butter; some tastes prefer less and some more. Three-fourths of an ounce to the pound is light salting, while one and one-fourth ounces to the pound is heavy salting. We use to the first salting just two-thirds of the amount, and after the second working add the balance. Never go by guess, but use the scales, and in this way insure uniformity. No one can acquire a reputation for good butter, who does not make a uniform article. It never yet was made by guessing. If on a churning of butter you guess

it three pounds less than it is, and on the salt three ounces more than it is, you will make it far too salt. There should be a slight allowance of salt made for the condition of the butter, for when it comes soft it usually contains more butter-milk than when it comes hard, and a greater percentage of the salt will be carried off in the extra whey.

Washing vs. Working.

Equally good results can be obtained by washing or working the milk from butter, when skillfully done under favorable circumstances. In either case the only object is to free the butter from the milk, with as little injury to the flavor or grain of the butter as possible. In washing butter, the danger is mostly in injuring the flavor by introducing foreign matter in the water, while in the other case, there is more danger in over-working and so injuring the grain. In localities where pure water cannot be obtained, washing should not be resorted to, for butter is always sure to take up the impurities contained, as it will the taint of any decaying vegetable or animal matter that may be near. Many wells and springs which the owners of, or users from, believe to be pure and good, have in them decaying substances which render them entirely unfit for any use, much less to wash butter with. Decaying organic matter so introduced into butter acts very much like yeast in dough; at least, it starts a fermentation, so to speak, which soon destroys the butter. Allow no surface water to get into spring or well, or any filth to remain in them, and if they are not highly charged with lime, mineral or salts of any kind, there is no better or easier method than to wash the milk out quickly and thoroughly before salting.

Packing Butter.

If for sale pack in good, strong, oak packages, whatever the size that may be decided on, and let them be uniform, clean, and nice looking. A good package will not sell poor butter, but a slovenly package will often condemn the best. Never use the round wooden boxes, with handles, they are an abomination. In packing have the butter still at 60 degrees, it is then firm and yet not hard. First rub the package, bottom and sides, with salt, just what will adhere. Put a quantity of butter in the middle of the package, and press down firmly—do not rub, but press, thus causing a perpendicular and lateral pressure; thus you make all firm and exclude air. Then what brine remains in the butter will work to the sides and with the salt prevent it from sticking to the wood. So continue until the butter is within an inch of the top. Lay on a cloth cut half an inch larger

than the package, and wet with brine, working the edges down smooth, cover with a quarter inch of salt, cut another cloth an inch larger than the package, lay this on the salt, working smooth, as before. Head tight, bore a small hole through the head, fill full with brine, cork tight, and if kept level, and the butter has been properly made, it will come out all right when wanted.

Preparing Packages.

Use nothing but white oak; scrub them thoroughly inside and out with hot water and a clean brush; fill with clean, pure water; let them stand forty-eight hours in a cool place; turn out, scrub again with hot water, rinse thoroughly with cold water, and, while wet, sprinkle with salt, what will adhere. It is then ready for use.

What Kind of Salt to Use.

None but absolutely pure dairy salt should be used. So far as the manufacture is concerned there seems little to choose between the best American or English make. There is one thing about English goods, if warranted good they are so—laws against adulteration being very strict in England while they are very lax in the United States. At a butter test some years ago before a committee of experts to decide if it could be discovered whether the samples were salted with English or American salt, the committee were very much at sea, guessing sometimes one way and sometimes another. Price being equal, we should use the best English dairy salt. Yet in all the best dairy salt, whether English or American, the impurities are so slight that in the salting of either butter or cheese there could be no taste whatever. If the impurity be sulphate of lime it would amount to nothing. It requires 400 times its weight to dissolve it, and there is almost no moisture in good butter. Another impurity is sulphate of magnesia, (Epsom Salts) which if present in sufficient quantity would give butter a peculiar but not a bad taste. Chloride of calcium would give butter a sharp, pungent taste. and which would seriously depreciate the value both of the butter and cheese in which it was used.

Cheese Making.

The making of butter is both chemical and mechanical. It has this advantage, that any person can make butter as good as the best if absolute cleanliness is used; if there are no foul odors about the premises; if

he temperature of the dairy be kept equal, and if pure water be used. This is all that is required, besides attention to a few simple rules. These we have given, and there leave the subject.

The making of cheese depends almost entirely upon chemical action. Unless the conditions are right, good and uniform cheese cannot be made. These conditions can hardly be obtained in a farm house. Hence cheese so made is never uniform, except in rare instances now and then in the hands of a perfect cheese maker. Such, if this strikes their view, should lose no time in building a factory, or engaging one already built. Hence it would be a waste of space to enter into the details of cheese making even in a general way. Yet many will want to make some cheese and we append an account of the process of some celebrated English brands from the pen of Mr. John Chalmers Morton, of England, who has written upon the subject in the following concise yet comprehensive manner:

Cheddar Cheese.

"The Cheddar cheese shall be described as it was carried on upon the farm of the late Mr. Harding, of Marksbury, Somersetshire, who was one of the best makers in England, and who did good work for cheese-making in Ayrshire and other counties and districts which he and Mrs. Harding visited on the invitation of agricultural societies and others for the purpose of giving instruction in the manufacture of this kind of cheese.

"The morning's and evening's milk are together brought to a temperature of 80 degrees Fahr. If the night has been warm, a temperature of 78 degrees will give as great effectiveness to a given quantity of rennet as one of 82 or 84 deg. would give if the milk had been at a lower temperature for some hours of a cold night. The evening's milk having been placed in shallow vessels during the night to cool, and having been stirred at intervals during the evening is skimmed in the morning, and the cream, with a portion of the milk, is heated up to 100 deg. by floating it in tin vessels on the boiler. The whole of it is then poured through a proper sieve into the tub—into which the morning's milk is being also strained as it arrives—so as to raise the whole, as I have said, to from 78 to 82 deg. Fahr. This tub may be a large tin vessel, capable of holding 150 gallons, and provided with false bottom and sides, enabling hot or cold water to be passed under and around its contents. The rennet, made from two or three dozen wells, in as many quarts of salt water, and allowed to stand three weeks, is added—half a pint to 100 gallons—and the curd sets in about half an hour. The small wells of

Irish calves, which are killed at about a week old, are preferred, and they should be eighteen months old before use. The curd is slowly cut with a single long blade to and fro throughout its depth, in lines forming a 4-inch mesh upon the surface, and the whole mass is gently turned over from the bottom with a skimming dish and the hand. The whole is then again worked throughout with a "shovel breaker," a four-fingered paddle with wires across the fingers—great care being taken to do it gently, so that the whey shall not become too white. The curd is thus broken up into pieces not much larger than peas, and at least half an hour is taken in the process. Hot water is then let into the space around and below the cheese tub, and the whole is raised to 100 deg. Fahr.; and this, too, is done gradually, so as to raise the whole by degrees, not heating any portion to excess. This also takes half an hour. The hot water is then drawn off, and the curd is stirred by the hand and a skimming dish for another half hour in the midst of its hot whey, being at last reduced to a mass of separate bits the size of small peas. The whey, after settling for half an hour, is then removed—ladled, syphoned, or drawn—to its vat, where it stands about six inches deep, and is skimmed next day, yielding a butter, which should not exceed in quantity six to eight ounces per cow per week.

The curd stands half an hour after the whey is drawn off, and it is then cut in four or five pieces, turned over and left for half an hour, after which it is again cut and left for a quarter of an hour. After this, it should be in the slightest degree acid to the taste. If allowed to become too acid, it will not press into a solid, well-shaped cheese, but will be apt to sink broad misshapen. It is now torn into pieces by hand and left to cool: and thereafter it is packed in successive thin layers in the vat—a cylindrical or wooden vessel twelve inches or more wide and twelve inches deep—whence, after being pressed for half an hour, it is taken out (it is then probably midday,) and broken up by hand, and allowed again to cool. Then, when cool, and hard, and sour, and dry, and tough enough, (all this, of course, being left to the judgment of the maker), it is ground up in the curd mill; two pounds of salt are added to the cwt. of curd, and the whole is allowed to cool, and as soon as cold, it is put in the vat, and taken to press. It is then probably 3 p. m. The pressure on the cheese may be 18 cwt. The cloth is changed next morning. A calico coating is laced on it the second day, and the third day the cheese may be taken from the press, placed in the cheese room, bandaged, and turned daily, and afterwards less frequently. The cheese room should be kept at nearly 65 degrees Fahr. The cheese will not be ready for sale for three months.

The process lasts nearly all the day, but it is believed to produce the best cheese in the world; and its use is everywhere extending. Taking

its name from a single parish, it now prevails all over North Somersetshire, and is gradually extending into Wiltshire. Many dairies in Gloucestershire adopt the system; and some of its characteristic details are followed in Cheshire; and it is well known in Lancashire, Ayrshire, and Galloway.

The Cheddar cheese is made of various sizes, generally twelve inches wide and a foot high, but sometimes larger in both dimentions, and from 70 to 100 pounds in weight; the object being to make all the milk of one day on a farm of thirty to forty cows into a single cheese.

Cheshire Cheese.

Cheshire cheese, like the Cheddar, is made only once a day. The evening's milk is placed, not more than six to seven inches deep, in tin vessels to cool during the night, on the floor of the dairy; it is skimmed in the morning, and a certain portion is kept for butter—in early Summer, only enough, perhaps, for the use of the house, but in Autumn more, and in some dairies at least, nearly all the morning's cream is thus taken for churning. The skimmed cream, with a portion of milk, is heated up to 130 deg. Fahr. by floating the tins which hold it, on the boiler—sufficient quantity being taken to raise the whole of the evening's and morning's milk together to 90 deg. or thereabouts. The rennet is made the day before it is used; 12 or 14 square inches of "vell" (rennet skin) standing in a pint of salt water, kept in a warm place, making rennet enough for 100 gallons of milk. The Irish vell (rennet skin) is used, as it is obtained from very young and milk-fed calves.

The curd is set about 50 minutes; it is then cut with the usual curd-breaker, a sieve-shaped cutter, very slowly. The whey is syphoned, pumped, or lifted out as soon as possible; but before it is all removed a portion is (on some farms where the Cheddar system is followed), heated and returned to the tub, and the curd is left in this hot whey for half an hour. The whey is then drained away and the curd is left to get firm. When firm enough to stand on the hand in cubes of about a pound weight—this is an intelligent indication—without breaking asunder, it is lifted out on the drainer (a false bottom of rods), in a long tub with a stop-cock to it, and there left covered up for 45 minutes, after which it is broken up and well mixed with the hand with 3 1-2 to 4 1-2 lbs. of salt per cwt. It is then allowed to stand with a light weight upon it for about three-quarters of an hour longer, and is turned over once or twice during the time, being cut for the purpose into squares with a knife. It is then twice passed through the curd mill, and at length put into the vat, a cloth being first pressed into place by a tin hoop, and the salted curd being packed

gently by hand within it. The vats will hold a cheese of 70 or 80 up to 100 lbs; and tin hoops, placed within them, are used to eke them out, and give capacity for a larger quantity of curd if necessary. After standing in the vat, with a weight upon it, from one to two hours, according to the weather, it is turned over and put, still in its vat, into the oven,—a warm chamber in or near the brickwork of the dairy chimney—where it remains at a temperature of 90 deg. to 100 deg. during the night. Both when in the press and here the cheese is skewered, skewers being thrust into it through holes in the vat and every now and then withdrawn, so as to facilitate the drainage of the whey. The cheese is taken out of the vat in the morning and turned upside down in a fresh cloth. It is in the press three days, and it is turned in the press twice a day, being dry-clothed each time. It is then taken out dry-clothed, bandaged, and removed to the cheese room, where it is turned daily, and at length only occasionally, until it is ready for sale. In some dairies all skewering is dispensed with, and no pressure is used at the time of making, nor for two days afterwards, but the whey is allowed to run out of its own accord. Cheese manufactured in this way requires from 5 to 7 days in drying, but afterwards matures more quickly for market.

The cheese varies considerably in quality throughout the year, the earlier make of March and April being considerably less valuable than that of Summer and early Autumn. Some of this varying quality is owing to the quality of the milk, the cows being house-fed; but more of it is, in all probability, owing to the necessity of holding a portion of curd over from day to day, when the quantity is insufficient to make even one, or it may be two, full-sized cheeses daily. In such cases it is common to make one full-sized cheese, and hold the remainder of the curd over till the next day, keeping it wrapped up on the drainer or pan, and grinding it up in the curd-mill along with the curd of the next morning.

How to Sell Butter.

There is never any difficulty in selling good butter at a liberal price in any market, however low grease butter may be. The maker of prime butter need never be in a hurry to sell. The butter once made, WILL KEEP. But it will not be necessary to keep it. There are always particular people in every town, however small, who are ready to take good butter at good prices. Thus it is usual for makers to contract to supply during the year at a stipulated price. During the flush season of grass, butter is packed down, to be drawn on when needed. Thus the manufacturer always has a supply on hand, and the customer is more than satisfied to have a good, sweet lump of butter on his table every day in the

year, and does not grudge the extra five cents above what he would have to pay the grocer, for what those who do not know the difference might suppose was good.

If a larger quantity is made than will supply the family trade of the village, the large markets are always open, and there good butter will always bring a good price. All that is wanted to know is that the butter is made by one whose reputation is established and who would not sell a bad article, and all that can be made will be eagerly taken. It is simply a question of cleanliness, attractive package, careful attention to the details in making, and as careful a determination never to ship when there is danger of the thermometer going below 60 degrees. The rest is all plain, clear sailing, with large profits accruing. To insure large profits from dairying, the master must be about early and late, night and day, and Sundays as well.

Utilizing Waste Products.

The skim milk, buttermilk, and whey, must be fed either to calves or hogs. As far as whey is concerned, there is not much good in it for the nourishment of calves, unless it be supplemented largely with meal and oil-cake. A shoat will fatten on the waste products of the dairy, one to each cow, by using a very little corn. Some dairymen prefer to feed the waste to the cows. This is probably not the best use to which it could be put. Skim milk and buttermilk is worth more to feed to calves, we believe, than disposed of in any other way. Here again we will give the experience of Mr. I. H. Wanzer, of Illinois, who believes with us that to make dairying permanently profitable, the raising of dairy cows must be a part of the business. To close the chapter we append his statement:

I tried the experiment, last season (1875), of raising calves upon the skimmed milk from my creamery; and as the result of this experiment may interest some of you, I will give you a few figures kept in connection with the experiment, from which you may draw conclusions as to whether it pays to raise calves in connection with a creamery or not.

Number of calves put in, 120, at $4.00 each	$ 480 00
Number of gallons of milk fed, 67,200, at 1 1-2c. per gallon	1,008 00
Oats fed, 840 bushels, at 30c	252 00
Cost of labor in feeding	255 00
Pasturage, stabling, etc	100 00
Total	$2,095 00
These calves sold at an average of $21.50 each, at an average of seven months old	2,580 00
Leaving a profit of	$485 00

This amount passed to the credit of the milk would bring it up to two cents per gallon, which is equal to six cents per pound for cheese, and this kind of cheese would not have brought three cents per pound at the season I fed it, for it will be remembered that this milk set thirty-six to forty-eight hours, and all the cream was taken out.

I am so much encouraged in this way of raising calves that I expect to stock again the coming season. I have now fifty-five young calves and ten older ones. Many of my neighbors and patrons are bringing their best heifer calves to me, and marking them, expecting to bid them in at my sale next Fall, I paying the market price for them when received

Diseases of Cattle.

THEIR CAUSES AND PREVENTION;
HOW TO KNOW THEM;
WHAT TO DO.

DISEASES OF CATTLE.

THEIR CAUSES; HOW TO KNOW THEM; WHAT TO DO.

CHAPTER I.

Diseases in General—Recognizing and Distinguishing Them.

FARMERS SHOULD UNDERSTAND SYMPTOMS. —— OF DISEASES IN GENERAL. ——USE COMMON SENSE. —— GRADUATION OF DOSES. —— FREQUENCY OF ADMINISTERING. ——FORMS OF DOSES. ——HOW TO GIVE MEDICINE. —— INJECTIONS. —— VAPORS, SPRAYING AND FUMIGATION. —— ANÆSTHETICS. —— TO DEPRIVE OF SENSATION. ——BLISTERING. —— FIRING. ——SETONS. —— ROWELS. ——SEWING UP WOUNDS. ——FOMENTATIONS. ——OPERATION OF BLEEDING. —— RECOGNIZING AND DISTINGUISHING DISEASES. ——THE PULSE. ——THE BREATHING. —— THE ANIMAL HEAT. ——THE SKIN AND HAIR. —— THE POSTURE. —— INDICATIONS OF PAIN. ——SPECIAL SIGNS IN CATTLE.

Introductory.

The immense value of the stock interests of the United States and the frequent outbreak of introduced contagious plagues, and of enzootic, epizootic and various epidemic diseases, that at intervals have visited localities or swept over whole continents, would seem to call for special training in veterinary science and art in every agricultural college in the United States; yet, until within the last few years, but little attention has been paid to this profession, and to-day the subject is not given that attention its importance demands, except in a few instances. Veterinary surgery has heretofore been flippantly termed "horse doctoring" by professors and heads of too many of the colleges, endowed with the people's money "to teach such branches as relate to agriculture and the mechanic arts"

Of late, however, a more enlightened course has been pursued. Many of the agricultural colleges are paying attention to this important study, especially since the violent outbreak of splenic fever over the West and East from the introduction of Texas cattle, and still more lately from the outbreak and spread of contagious pleuro-pneumonia in a number of the Atlantic States. Owing to the low state of veterinary science generally, and the disdain with which the few highly educated and thoroughly scientific investigators in the United States — mostly French and German graduates — have been looked down upon by those who should have been too glad to welcome them to the profession of medicine, and the esteem in which mere quacks and leeches have been regarded by the community two notable facts are made patent: First, the exclusiveness of certain puffed up "college Dons," who suppose that all knowledge must come from classic sources. Second, that the people at large, farmers and stock raisers, who from their habits and training could not be supposed to understand surgery or medicine, except in its simplest forms, have been thrown into the clutches of mere pretenders to anatomical knowledge and the treatment of diseases. Of late there have been many honorable exceptions, until now nearly or quite all of these people's colleges, forced thus in many instances by public outcry, are taking strong means to foster veterinary science, and make it what it should be, and really long has been in other enlightened countries, an important, as it is an honorable branch of human science.

There are many valuable works extant in various languages, upon veterinary science and practice. They will be of little value to farmers and stockmen; all that this class can deal with must necessarily be only those symptoms that can readily be discerned, and remedies so simple in their nature that they can be easily procured and applied. In fact great care and attention should be given to first symptoms, as also to good nursing. Discard all strong physics, and heroic treatment by purging, bleeding, and the surgery of main strength. Good care and nursing in the treatment of animals is now regarded (as it is in the treatment of human patients) as among the most important means of cure. Indeed with animals it is of the greatest importance, since brutes are only able to indicate the region of pain and disease by mute signs, entirely unintelligible in the majority of cases to the ordinary observer.

Of Diseases in General.

In the description of symptoms, and the treatment of diseases, it would be out of place here to go into learned discussions on the nature and pathology of diseases; so also it would be futile to dilate upon the

symptoms and treatment of diseases. Only those most common, or fatal, will be specially noted. Fortunately veterinary art is congenial with the medical treatment of the human family, and the same paths that lead to a knowledge of human diseases will indicate to any intelligent local physician the means to be used with brutes. Humane physicians, now-a-days,—to their credit be it said.—are not slow in coming to the relief of the farmer and stockman in prescribing and giving advice in the absence of regular veterinary surgeons. Such are veritable benefactors, inasmuch as they greatly alleviate distress and do much to discourage quackery; and when found, they should be freely consulted. This deviation from the regular medical practice, owing to the sparsely settled nature of many portions of the country, seems very necessary and even imperative.

In the prescriptions for cattle, we shall use the most simple formulas possible, wherever found, and whatever simple medicines will avail, especially those compounded of herbs, as better adapted to the treatment of domestic animals. In connection with these, other agents, both mineral and mechanical, must be employed. In short, what we have aimed at is to state symptoms and remedies for such diseases as may be treated without the advice of a regular veterinary surgeon, and in such language as any intelligent person may understand.

In this, while we shall not attempt originality, except it may be in the matter of presentation in some instances, we shall use and quote from the very latest authorities in veterinary science in the United States, England, France, Germany, Austria, Belgium, Holland, Sweden, Italy, and other minor countries, where veterinary science has been accorded that respectability which should accrue to a labor having for its aims the saving of life, and the amelioration of suffering, in a direction second in importance only to that of the human family; and in preventing loss, so far as it may be possible, of live stock, the raising of which is of greater importance to mankind than any other single human industry. Thus, in presenting symptoms, we shall use and quote freely from the latest works in reformed practice. What we present will not be as seeking so much to aid the veterinary practitioner, as the farmer himself; not a work to supersede other authorities, but a substitute, in a limited sense, as to the treatment of certain diseases, so that the intelligent reader may comprehend; advising, in every case, when the operator does not understand the symptoms clearly, to seek the advice of the professional veterinarian, if such may be had. If such be not within reach, then consult the best physician in the neighborhood. Diseases are substantially the same in causes, symptoms and treatment, whether men or beasts be their subjects. Remembering this may suggest a helpful course of treatment in many cases.

Use Common Sense.

Why, in the sickness of animals, the owner should try random remedies, and go from one to another, at the suggestion of each different adviser, as the matter may seem to strike them, is inexplicable. In nine cases out of ten, with proper nursing and care the animal will recover, simply by keeping the bowels moderately open by mild physics and injections (which will be indicated) when costiveness and impaction is present; or by sedatives, stimulants and astringents when the reverse condition is exhibited.

Such conditions as are often fatal during the gravid state of female animals, and succeeding delivery, abortion, false presentation, etc., and the means of relief; contagious and epidemic diseases—these from their special importance will receive due prominence. Of the non-contagious and local diseases every farmer should seek to make himself familiar with the symptoms, so that ready means may be used for the relief of suffering animals.

In all this detection and treatment the operator must be guided by intelligence and use the least possible exhibition of force. It may be necessary to hamper an animal for the performance of some operation. When necessary, it is not merciful to use half-way measures. The humane man, however, will do so with as little pain to the animal as possible. If necessity should require killing as the best means of dealing with the ailment, the humane man will be actuated by no sentimentality about taking the life of an animal. He will kill promptly and surely, as the best means of alleviating the suffering of the animal, or of preventing the spread of infectious and contagious diseases. Prompt measures under these conditions will often save the loss of many lives.

Graduation of Doses.

As a rule cattle require one and a half times as much as horses; sheep and pigs require one-third as much. Professor James Law, of Cornell University, in his work, *Veterinary Adviser*, has presented the manner of graduation, frequency, and form of administering doses, in the following concise language:

The doses given may be held applicable to full-grown animals of medium size, therefore some allowance must be made in any cases in which the patient exceeds or comes short of the average of his kind. A similar modification must be made as regards young animals, not only on account of their smaller size but also of their greater susceptibility. The following table may serve as a guide:

TABLE OF DOSES FOR DIFFERENT ANIMALS.

Horses, etc	Cattle.	Sheep.	Swine.	
3 years.	2 years.	1 -2 years.	15 months.	1 part.
1 1-4—3 years.	1-2 "	9-18 months.	8-15 "	1-2 part.
9-18 months.	6-12 months.	5-9 "	6-8 "	1-4 "
5-9 "	3-6 "	3-5 "	3-6 "	1-8 '
1-5 "	1-3 "	1-3 "	1-3 "	1-16 '

Allowance must also be made for a nervous temperament, which usually renders an animal more impressible; for habit, or continued use, which tends to decrease the susceptibility for individual drugs; for idiosyncrasy, which can only be discovered by observing the action of the agent on the particular subject, and for the influence of disease when that is likely to affect the action Thus, in most diseases of the brain and spinal cord, and in some impactions of the stomach, double the usual quantities of purgative medicine will be necessary: while in influenza, and other low fevers, half the usual doses may prove fatal. In acute congestion of the brain, stimulating narcotics (opium, belladonna, hyoscyannus) would aggravate the symptoms, etc.

Frequency of Administering.

Anodynes, antispasmodics, narcotics, sedatives, and stimulants, may generally be repeated once in four or six hours in order to maintain their effect. Alteratives, diaphoretics, febrifuges, refrigerants, and tonics, may be administered twice daily. Purgatives should only be given when necessary, and should never be repeated until from the lapse of time we are assured that the first dose remains inoperative. Thus, unless in urgent need, a horse should not take a second dose of physic under thirty-six hours after the exhibition of the first; and in all cases, until the medicine has worked off, he should be kept at rest and allowed only warm bran mashes and water with the chill taken off. In ruminants a second dose may be ventured on in twelve or sixteen hours, and in carnivora (dogs, etc.) and omnivora (swine, etc,) in from seven to ten hours. Emetics should be given in full doses, and repeated in five or ten minutes if they fail to take effect, their action being further provoked by copious draughts of tepid water and tickling the roof of the mouth with a feather.

Forms of Doses.

Drugs may often be given as powder or solution in the food or water; they may be made into a soft solid with syrup and linseed meal, rolled into a short cylinder and covered with soft paper; they may be converted into an infusion with warm or cold water, or into a decoction by boiling:

or they may be powdered and suspended in thick gruel or mucilage. They may be given, in a liquid form, from a horn or bottle; or, as a short cylinder or pill, which may be lodged over the middle of the root of the tongue; or, as a sticky mass, they may be smeared on the back of the tongue: may be given as an injection into the rectum; or, finally, in the case of certain powerful and non-irritating agents, they may be injected under the skin.

No agent should be given until sufficiently diluted to prevent irritation, if retained a few minutes in the mouth, and irritants that will not mix with water (oil of turpentine, Croton oil, etc.,) should be given in a bland oil, in milk, or in eggs after being thoroughly mixed.

How to Give Medicine.

Few things are so awkwardly done, as a rule, as giving medicine to farm animals. In the hands of a careful and expert person, a strong glass bottle is good. A better instrument is a flattened bottle of block tin, which for cattle should hold two quarts. The most usual instrument, and on the whole the best for ordinary operations, is the horn. Select one of which the point turns down and the large end up; form this of the proper size and fashion so the opening will be oblique.

Drenches should always be thoroughly mixed, and well shaken before they are given. If a fit of coughing ensues, free the animal at once and until it be ended. In operating with cattle do not irritate the animal unduly. Always operate from the right or off side. Pass the left hand over the head, and in front of the horn, seize the upper jaw firmly in front of the grinders, turn the head firmly back, the operator standing well braced, the back firm against, and as well forward of the shoulders as possible. Thus having the animal with one side against a wall, or the side of the stall, it must be a very vicious cow or bull that a strong, expert man cannot handle. If, however, the operator does not stand well forward and well braced, he may be severely kicked, since an ox, like a deer, can reach well forward with their hind feet. The usual quantity for an ox is from one to two quarts at a dose, if liquid, of ordinary decoctions and solutions.

Injections, or Clysters.

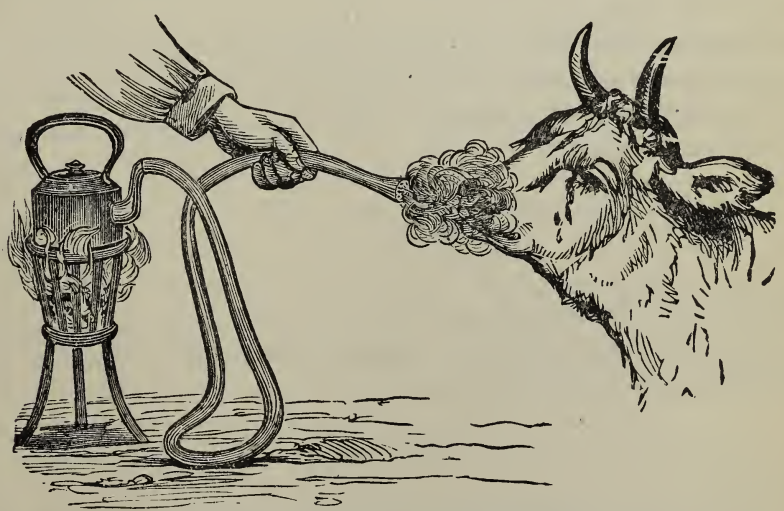
A large number of medicines, both liquid and solid, may be as easily administered per rectum as by the mouth. In administering injections, it is not necessary that much pressure be used. The intestinal canal of animals is lower than the opening. Thus fluid substances will fall by

their gravity. A good instrument for use may be a pail, with a tube extending from the bottom connecting with a half-inch rubber hose, of suitable length, so that the pail may hang just high enough above the animal to be out of their reach in moving about. Oil the end to be inserted into the rectum, and the fluid may be passed into the gut, as much or as little as may be desired, and with much better effect than when strong pressure is brought to bear on the fluid.

When solid substances are administered per rectum, they are called suppositories. They are often useful and simple, as in the case of a small cylinder of soap, for young calves, to encourage the action of the bowels and ducts: and in the case of cows, in the use of disinfectants, to purify the discharges and lessen the danger of puerperal fever; suppositories are made into form by means of soap, starch, lard, etc.

Vapors, Spraying and Fumigation.

These are medicaments drawn in with the breath. Chloroform and ether may be administered by means of a sponge filled with the agent and



APPLICATION OF STEAM TO THE NOSTRILS.

held to the nose. Vapors are easily produced from liquid substances by means of an atomizer, sold by all druggists.

Steaming is often of great benefit. Hot water, either plain or medicated, may be held under the animal's nose, and the steam strongly driven off by plunging a hot iron into it at intervals. A hot bran mash, in a nose bag, readily gives off steam. A better form for steaming the nostrils would be that given above.

For the promotion of discharge of the nostrils, the nose-bag will be indicated; its form and fastenings are shown in the annexed cut.

NOSE BAG FOR STEAMING.

Powders for easing the expulsion of the secretions of the nostrils, or for local application to diseases of the inner surface of the nose, may be a simple tube of tin in two parts, which may be taken apart and put together like the joints of a stove-pipe, with a rubber tube on one end and a mouth-piece on the other. Charge with the powder, and blow with sufficient force to carry the agent where wanted.

When an anæsthetic is used, it should not be held to the nose continuously, since, if undiluted with air, it is fatal. Watch carefully and suspend the use of the anæsthetic as soon as unconsciousness is produced, to be renewed from time to time as may be necessary. They should not be used unless under the advice of a surgeon or physician, since the need can hardly be expected except for the performance of some intricate surgical operation. The following is endorsed by high veterinary authority:

No 1. 1 Oz. alcohol,
2 Oz. chloroform,
3 Oz. ether.

Shake the bottle well before using it; pour a teaspoonful or more at a time on a sponge; hold it to the nostrils. Two or three moments should be enough to overpower the strongest ox.

Blistering.

Blistering is a valuable remedy, when it is required to ease the absorption of deposit, to stimulate the vessels to effect organic change, as hastening the ripening of an abscess, or the reduction of an enlarged gland; they should be entirely confined to cases where the acute inflammatory symptoms have ceased. Blisters do no good in deep-seated inflammations. Yet the quack, if he *suspect* internal inflammation, claps on a blister, which only agonizes the dumb brute, and generally leaves a permanent blemish. When a blister is found necessary, before applying, always as

an ointment or fluid, and never as a plaster, cut or shave the hair from the part, wash and dry thoroughly, and apply with strong friction for several minutes. The following, if thoroughly applied, will raise a blister, and will not leave a blemish:

No. 2. 1 Oz. Powdered Cantharides,
12 Oz. Lard heated to 212 deg. Fahr.
Mix well together and stir until cool.

A sweating blister of medium strength to be used to produce irritation and a watery discharge without raising a full blister, and which may be applied separately to the same spot and without removing the hair, is made as follows:

No. 3. 1 Oz. Powdered Cantharides,
1 Pt. Alcohol.

Add neither corrosive sublimate, arsenic, acids, nor turpentine to blistering agents. They are not useful, are often injurious, and always give unnecessary pain.

As a rule, sufficient irritation can be produced on cattle by mustard and hot water, well rubbed in, and this form should be used except in particular cases. The following rules should be carefully remembered:

1.—Never blister more than one or two spots at the same time.

2.—Be careful about blistering in hot weather.

3.—Never blister an inflamed part when there are symptoms of mortification.

4.—There is always danger of producing strangury in horses from blistering.

5.—When a blister causes great nervous irritability, loss of appetite, or difficult urination, wash the blistered surface with strong soapsuds of soft soap, dress it with sweet oil, and give a full dose of opium.

6.—The second day after a blister has been applied, foment the part with warm water, and dress it with lard or oil.

7.—An animal that has been blistered should be prevented from biting, rubbing, or otherwise irritating the blistered part.

Firing.

The actual cautery is most valuable in bone diseases, or chronic lameness. In certain diseases it cannot be successfully replaced by any other counter-irritant. The iron should be at a full red or white heat, and used with a light hand, so that a distinct impression is made. More than one leg

should not be operated on at one time. It should never be performed by inexpert hands. The hair must be closely shaved, and the animal securely fastened. A better way for the novice is to cut a piece of bacon rind with some of the fat attached. The iron, which should be flat or slightly hollowed, is to be heated to a dull red heat. Place the bacon rind on the sprain or tumor, and apply the iron firmly for two or three minutes, and afterwards more lightly, until the rind is dried or burned. This may be repeated at intervals of two or three days. The influence will be potent, and will leave no scar. It should never be used on cattle, except in the case of a tumor, where the animal is valuable.

Setons.

Setons are used in cases of bone diseases, in the healing of old fistulas, by producing a new and healthy inflammation in its sides. They should be inserted the whole length of the canal.

Setons are composed of tapes, threads, or fine wires, pushed just underneath the skin by means of a seton needle, entering at one point and coming out at another. Fasten the ends, to prevent dropping out, smear with irritant salve and turn every day or two to keep up a constant irritation and discharge. The following will be found good ointments for smearing the setons:

No. 4. 1 Part powdered cantharides,
8 Parts oil of turpentine,
8 Parts Canada balsam.

Put the two first in a bottle and keep warm for two days and add the balsam

A simple ointment would be:

No. 5. 3 Parts citrine ointment,
1 Part oil of turpentine.
Mix.

Rowels.

These are wounds made with rowel scissors or a bistoury, and kept open with a pledget of tow or other substance, smeared with ointment, as used for setons. They are rarely used now by good surgeons, and are not to be recommended, since their action is that of the seton.

Sewing up Wounds.

The bleeding of wounds having been checked and properly cleaned, the edges are brought together and held in position by means of stitches

or sutures. The interrupted suture is made by carrying a suture needle armed with white silk or white linen thread, through the two edges of the wound and cutting off, leaving about three-inch ends on each side of the cut; bring together and tie. So proceed until you have the wound nicely closed, the lips of the wound or skin being carefully brought together.

The twisted suture is better in inexpert hands when it can be used. Bring the edges of the wound together, pass a strong pin through to hold in place, and twist a fine wire or lace a strong thread across the protruding ends of the pin to hold the edges of the wound firmly together. So proceed at intervals of three-eights of an inch until the wound is closed.

The wound thus sewed, dress with a plaster or ointment and bandage to prevent threads or pins from being torn out. Remove them as soon as the surfaces have united, which should be in four or five days.

Fomentations.

These are applied by wrapping the part to be treated with flannel bandages or woolen cloths, and keep the wrappings constantly wet with hot or cold water, or mixed with any appropriate addition as vinegar, laudanum, etc. They are used to cleanse or soothe irritable wounds, to reduce internal inflammation, or relieve external inflammation. Unless persistently used for hours and kept constantly wet, they had better not be attempted. After the operation is finished, rub dry and clothe warmly, to prevent chill, which will surely occur. As an additional precaution, a little mustard rubbed in would be beneficial. When it can be applied, a sheepskin with the wool on, wrung out of hot water, makes a good agent for fomentation.

The Operation of Bleeding.

There is no operation in veterinary practice that has been more abused by quacks and other persons ignorant of the true necessity, than bleeding. It should never be performed except by those who have been instructed in the operation, and only in those cases where by common consent of the profession it is allowed. If a decided impression is to be made, as in apoplexy, from five to seven quarts should be taken from an ox, according to the conditions. If the jugular vein is pressed upon just below where the incision is to be made, it will soon show prominently. Use a thumb lancet in preference to a fleam. When sufficient has been taken, raise the two lips of the wound, and bring them together between

the thumb and finger, pass a common small pin through the edges and weave thread across and over to keep all in place.

Recognizing and Distinguishing Diseases.

The following explicit and detailed rules for recognizing diseases in animals, should be carefully studied: Anyone who would become expert in recognizing diseases in animals, must study them carefully in the healthy state, and make himself thoroughly familiar with their habits, appearance and general physiology. He must practice feeling their pulse and the heart, listening to the sounds of their lungs in breathing, and taking their temperature, by feeling the skin and also by using a properly constructed thermometer. He should watch the appearances of the eye and tongue, and note the positions assumed when asleep and awake. He should observe the character and frequency of their appetite. For it is in the variations from health in these particulars that the veterinarian discovers the guides which lead him to the recognition of the particular disease he has to treat. We will examine each of these items separately, and assure our readers that if they will verify our statements by practice on the living animals, they will soon be in a position to take charge of them when sick, quite as well and often a great deal better than the average farrier, as he is to be found in this country.

The Pulse.

The pulse differs very much in the domestic animals. In the full grown horse at rest, its beats are about forty per minute; in the ox from fifty to fifty-five; and in the sheep and pig, about as in man, that is, averaging seventy to eighty beats in the minute. In calves and colts, and in animals well advanced in years, the pulse increases, in health, to about twice these figures; and it is also increased by hot, close stables, full feeding, and the condition of pregnancy.

The pulse may be felt wherever a considerable artery passes over a bone. It is usually examined in the horse on the cord which runs over the bone of the lower jaw, just in front of its curved portion; or on the bony ridge extending upward from the eye, or inside the elbow. In cattle conveniently reached over the middle of the first rib, or beneath the tail. There is a marked difference of force in the pulse of the two species; that of the horse being full and rather tense, while in the ox it is soft and rolling.

When the pulse differs materially from these conditions in any direction, it is a sign of disease. If rapid, full and hard, there is high fever

or acute inflammation; if rapid, small and weak there is low fever, loss of blood, or weakness. If very slow we may suspect brain disease; if irregular, now fast and in a few seconds slow, we should look for a diseased condition of the heart.

In the sheep, the pulse if felt by placing the hand on the left side, where the beatings of the heart can be felt; or at about the middle of the inside of the thigh, where the femoral artery passes obliquely across the bone.

The Breathing.

The breathing is next in importance. If the ear is applied to the throat of a healthy horse or ox the air will be heard passing through the windpipe with a regular, steady, blowing sound; if applied to the chest a soft rustling murmur will be heard, like a gentle breeze in the tree tops, caused by the air passing in and out of the fine tubes and vessels of the lungs. But where the lung or throat is diseased, these sounds are very much changed and in many directions, which it is not necessary to dwell on here, but which will at once indicate the presence of something amiss with these important organs.

If the forefinger of the the left hand is placed firmly on the chest and smartly tapped with the ends of the three first fingers of the right hand, the sound will be noticed to be more resonant and clear than when the same procedure is practiced on the solid thigh. This is because the lungs are not solid, but are always in health well expanded with air. But in various diseases, as pneumonia and pleurisy, they fill up with fluid and become solid, then the sound given out, by thus percussing them, as it is called, is like that on any other solid part of the animal. Hence this is another very important indication of disease.

By practice on healthy animals the character and boundaries of these sounds can be learned so closely that any variation from them will be at once detected, and will sometimes reveal the presence of an unsound condition when nothing else will.

The rapidity with which the act of breathing is performed can easily be counted by the heaving of the chest. In health in the adult horse at rest it is from eight to twelve times a minute, and in the ox a little faster. Any great increase without obvious cause, is a positive sign of diseased condition.

The Animal Heat.

The temperature of animals can be ascertained, to a slight extent, by

the feel of the skin, the ears, and the legs. A hot, dry skin in a horse generally accompanies a feverish condition. Cold ears and legs are a sign of serious disease. But the only scientific, that is, accurate plan, is to use what is called a "clinical thermometer;" that is, one, the bulb of which can be bared and inserted into the rectum. After it has remained there two or three minutes, the mercury will accurately indicate the temperature of the blood. This in health is 98 degrees, and any deviation from this, even of a few degrees, is a certain sign of disease. Those veterinarians who have practiced sufficiently with this instrument to become skilled in its use, declare it invaluable in their business, as affording them grounds for opinions about diseases which no other symptoms could.

Thus it has been found that every disease has its own degree, a temperature at which it is either favorable or fatal. For example, if in that sometimes prevalent epidemic among horses, cerebro-spinal meningitis, the thermometer rises as high as 104 degrees, it is a certain indication that the horse will shortly die; while in such a disease as inflammation of the lungs, the mercury will register 108 degrees, or 109 degrees, and the horse recover. If in gastric or typhoid fever the heat has been 103 degrees, and falls to 100 degrees, and then suddenly rises again to its previous figure, the chances are terribly against the patient, no matter what the other appearances may seem to say. These few examples will serve to show how valuable the instrument may become in the hands of an intelligent person.

The Skin and Hair.

The skin in its general feeling and appearance is an important guide to the condition of an animal. A dry, scurfy appearance is a system of indigestion, and liability to joint affections. What is called "hide bound" is a symptom of a general state of poor nutrition, arising from indigestion, improper food, worms, or a want of proper exercise. The skin feels stretched and hard, as if too small for the body. The condition known as "staring coat," when the hairs stand out like bristles, is often the only symptom of a low state of health. Whenever an animal is disposed to shiver, with shedding of the coat, when exposed to moderate cold, or without such exposure, it is on the edge of some disease. A persistently staring coat, without other symptoms of disease, often indicates the approach of an attack of farcy or glanders; and when with this are repeated shivers or chills, we may expect the strangles, weed, or other diseases with suppuration. When in an attack of disease the skin becomes covered with a cold sweat, the life of the animal is in great danger.

The Posture.

The position of an animal, its mode of standing and lying down, are all significant. Lying persistently on one side, or obstinately maintaining one position, shows that any other is painful. Horses stand as long as they possibly can, as they breathe much easier in the upright position; and if they once lie down, they soon despair and die. Hence the rule is with a horse to sling him up, in various ailments. With cattle it is different, and it is much less important to keep them erect. When animals cannot rise, it may be from weakness, or from palsied limbs, or from severe injuries or sprains.

Indication of Pain.

The feeling of pain in animals is indicated by their flinching when the painful part is touched; by the care which they take in lying down, walking or standing to "favor" the part, and by the appearance of the eye. Distress and suffering are generally plainly apparent in the face of sick horses and cattle.

Special Signs in Cattle.

In cattle, the horn at its root yields, by the sensation it imparts to the hand, a rough idea of the temperature of the blood, and the cow-leech generally feels it as the doctor does the pulse, as a part of the indispensable programme of a professional visit. If the temperature is natural, he concludes there is no fever; if cold, and the tips of the ears also cold, it is a sign of some serious internal congestion; the blood no longer circulating in natural force through the extremities.

The muzzle is another part he takes note of. In health this is moist, covered with "dew," as the saying is; but in disease, especially fever, it is dry, hotter or colder than natural, and sometimes changed in color, paler or injected with blood. By looking at the flanks, the regularity of the respiration is noted, rapid and irregular heaving there betraying the disturbance of the important function of breathing. In ruminants also, the second mastication of the food is among the first of the vital processes to become disturbed in disease. When a cow or an ox "loses the cud," as it is called by herdsmen, that is, ceases to ruminate without apparent cause, there is sure to be a feeling of sickness about the animal which is thus interfering with one of its processes of digestion. No animal can thrive in this condition, it needs attention.

CHAPTER II.

GESTATION, DISEASES AND ACCIDENTS THEREOF.

PLURAL AND MULTIPLE GESTATION.——TREATMENT DURING GESTATION.——BIRTH. ——PROLONGED LABOR.——LARGE PRESENTATION. —— UNNATURAL POSITIONS OF THE CALF.——FLOODING. —— PRESENTATION OF AFTER-BIRTH.—— INVERSION OF THE WOMB. —— LANGUID LABOR. —— IRRITABILITY AND STRAINING. TEMPORARY PARALYSIS.——ABORTION.——ISOLATION.——MILK FEVER.——MAMMITIS. ——TREATMENT OF CALVES.

Plural and Multiple Gestation.

Fleming, in his work on Veterinary Obstetrics, gives a lucid and accurate account of single, plural, and multiple gestation in animals.

Among the domestic animals there are species which are naturally *uniparous*—produce only one at a birth; and others which, in a normal or physiological manner, bring forth two, three, or more, at a time, and are therefore designated *gemelliparous* or *multiparous* gestation, being known as double, triple, quadruple, &c.

It is seldom that twins are produced by the larger domesticated animals, and particularly by the mare and ass, though instances are recorded of these; while in the cow, sheep, and goat, the occurrence of twins, triplets, or even more young creatures at a birth, are not so scarce.

The causes of *multiparity* are not well ascertained. It may be due to simultaneous ripening of two or more Graafian vesicles, which, rupturing at the same time, allow the escape of the ovules they contain, and which may become impregnated at a single *coitus*. Or a Graafian vesicle may contain two or more ovules, as Brischoff has witnessed in women; and these arriving together in the uterus, may be fecundated at one time. Or it may even happen that the vitelline membrane contains two yolks, as sometimes occurs in the fowl's egg; and as the vitelline mass is the essen-

tial part of the egg, it is evident that when this contains two of these masses, they ought, if fecundated, to produce two embryos.

In the first case, as Saint Cyr points out, each fœtus has ordinarily all its annexes distinct and completely independent; or it may be that the two charions are fused together, in which circumstance the two fœtuses will then have a common envelope. In the second hypothesis, this fusion of the charions appears to be the rule, although the envelopes may also be independent; and in the third case—that of the two vitelluses contained in the same vitelline membrane—not only the envelopes but also the fœtuses may become united more or less closely and thus give rise to double monsters.

Finally, it is also possible that two ovules may become detached from the ovarian cluster, though not simultaneously, but successively, and be fecundated, one after another, at two successive copulations within a brief period. Occurrences of this kind are by no means rare, yet have been wrongly adduced as instances of superfœtution.

What to Do During Gestation.

As a rule the cow should be dried about the sixth or seventh month when stock breeding is the object. When milk and not calves is the object the flow may be continued to within six weeks of calving.

Grazing should always be allowed as much as possible, the exercise and grass both being favorable to healthy gestation. In Winter the food given should be nutritive, easy of digestion, cooling, and of such quality as not to induce either constipation or undue laxity. Water should be especially pure and plentiful, and not excessively cold; in fact, all frozen food is to be avoided. Cleanliness is essential. Harsh or cruel treatment, running by dogs, all danger of fright must be avoided. Surgical operations and severe medication is to be avoided, especially drastics. Suitable diet is to be used as a regulator of the bowels; powerful narcotics, sedatives, and other strong physics, if they do not impair the dam may imperil the life of the fœtus. The veterinary anomalies in gestation are fully treated in Fleming's work on Veterinary Obstetrics to which we are indebted for much valuable information.

Births.

As a rule in natural parturition there is nothing gained by undue haste. The animal should have quiet and be left to itself so long as everything is going on tolerably well. In the majority of cases nature will assist herself to a safe delivery. A roomy stall, in Winter well warmed, should

be provided with rather thin but compact bedding. In Summer, or other mild weather, let the cow be out-of-doors by all means; in a small grass lot is best.

Prolonged Labor.

When the labor is prolonged from excessive size of the fœtus, and this is suspected beforehand, or if time do not press and there is no special excitement in the cow, and there is delay in the descent of the calf, oil the hand and arm and feel for the neck of the womb in the vagina. If it be rigid carry extract of belladonna up the vagina and smear the neck of the womb for a few times. This should cause relaxation of the parts. If the time is passing carry a narrow-bladed, blunt-pointed knife in the hand in the vagina; find the mouth of the womb with the forefinger, slip the knife along the finger until it enters the neck of the womb about a quarter of an inch, and make a slight cut in all four sides of the neck by turning the knife. A slight nicking will suffice, since the mouth once loosened in its contraction, the neck will give way, and the bag of water will accomplish the rest. The utmost care is needed in such work, however.

Large Presentation.

Sometimes the calf is so large that the muscular efforts of the cow can not force the mass forward. In this case do not resort to strong means until all others fail. Let a small-handed man introduce both hands, well oiled, up the vagina, carefully working forward beside the calf, gradually pressing apart the orifice; pass closely to the calf with the hands, and as the pains commence, pull forward as strongly by pressure against the fœtus. When a main effort is made pull forward, and at the same time slip the hands slowly back, and the calf will often follow. Repeat this again and again as the pains are renewed. We have never failed in but one case in so delivering the calf, and in this case the calf had to be dissected in the body. This no person unskilled in surgery should attempt.

Unnatural Positions of the Calf.

These are various, and, except in the six cases we mention, and in the order of their frequency, resort should be had to a veterinary surgeon. The following manner of relief is endorsed by various reliable and well-known authorities:

Unnatural Positions of the calf.—The natural position of the calf on

its exit from the womb, is with its head and fore-feet first, the head between the feet and the back upwards. Six unnatural positions are enumerated by writers, which demand the assistance of the surgeon. We give them in the order of their frequency, with the appropriate treatment they require.

First—Position with tail first. Press the haunches back with the palm of the hand, take hold of the bend of the hough of one leg, pull at it and reach the foot; seize the other foot in the same manner, bring them forth and deliver the body.

Second—Position with fore-feet appearing without the head. Push the feet back until the head can be seized either by the jaw or nose, and pull it down between the feet. No further aid will be required. This needs a long arm, and prompt action between the pains.

Third—Position with belly upward, head over one shoulder, fore-legs first. Gently push the calf back between the pains, and bring the head down between the legs.

Fourth—Fore-feet first, with head under the brisket. Push the calf back, find the head, and draw it down between the fore-feet.

Fifth—Head alone, or only one fore-foot with it. Push the calf back and search for the fore-feet, or foot, under the belly; when found, bring forward one at a time, by placing the hand under the knee and using gentle pressure.

Sixth—Belly upwards, the fore-legs folded and against the mother's back, the head, side or hind-leg appearing. If the hind-leg appear, put it back; seek for the head, and if possible turn the calf, to bring the fore-feet and head to the mouth. When this fails, throw the cow, put her on her back, and with a rope and pulley, or two or three stout assistants, raise her hind-quarters considerably higher than her shoulders. In this position the calf can be easily pushed back in the uterus, so that it can be turned and brought to the natural position.

Many surgeons make it a rule to fasten the part presenting with a cord and slip-knot before going in search of the part they desire to bring to the mouth. The cord is held by an assistant, and serves as a guide.

The principal obstetric instrument in the cow is the hook. This is made of wrought iron, four inches long, with a loop for the cord at the straight end. When by no other means the calf can be delivered, or when removing a dead fœtus, this hook is fastened in the socket of an eye, under the jaw or in an ear, and by gentle and steady traction the resistance is overcome.

Finally, the fœtus may have to be taken out piece-meal, an operation which requires considerable skill on the part of the operator, to avoid wounding the womb and vagina when he is dissecting the calf.

In all such operations certain general rules should be observed, as follows:

First—Thoroughly anoint the hand with lard, or oil, before introducing it into the vagina.

Second—Make the examinations while the cow is standing, and between the pains.

Third—In pulling at the feet, enclose the claws in the hollow of the palm, so that they will not tear the delicate coats of the womb.

Flooding.

Sometimes after a natural birth which has been rapid, and often after an abortion which has been brought on by violence, there is a severe attack of "flooding," or bleeding from the womb. It may escape from the vagina, or it may be indicated by paleness of the mouth and nose, weak pulse, great weakness and coldness of the surface, and the womb be found to be filled with clotted blood.

Treatment.—The hand should be introduced into the womb, the clots and any remaining portion of the after-birth seized and extracted, and a sponge dipped in hot vinegar and water, or very hot or very cold water alone, be wrung out in the uterus. A full dose of fresh ergot of rye, one to two ounces, should be given without delay.

If these measures fail, a piece of ice the size of a walnut should be carried into the womb and left there; or a tea-spoonful of powdered alum should be stirred in a tea-cupful of milk, and a sponge of this be squeezed out in the womb. Internally, Prof. Gangee recommends, for either the mare or cow,

No. 6 — 3 Oz. Compound tincture of cinnamon,
5 Oz. Diluted sulphuric acid.

Mix and give two table-spoonfuls for a dose every one or two hours, in a quart of water.

Retention of After-birth.

There are many causes leading to this. The most common of these are hurried deliveries, adherence of the after-birth to the walls of the womb, and poverty of the animal. Retention for two or even three days under ordinary circumstances is not especially serious. If left to putrify, fetid discharges will exhaust the animal. The blood is poisoned, and the animal either dies or remains unhealthy for life. After forty-eight hours, if trouble still exists, the hand and arm well oiled should be introduced,

and the after-birth carefully separated from the walls of the womb by picking with the fingers and nails, and gradual but firm pulling. The whole having been completely removed, syringe the vagina thoroughly with the following:

No. 7. 1 Oz. Chloride of lime,
1 Qt. ft water.

Give the following as a physic:

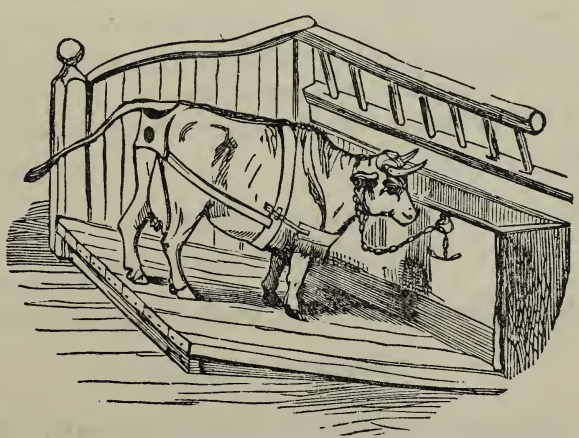
No. 8. 8 Oz. Epsom salts,
½ Oz. Ginger pulverized,
¼ Oz. Caraway seed pulverized,
2. Drachms Copavia.

Give as a drench. If there is a tendency to bleeding, give the following:

No. 9. 2. Oz. Ergot of rye, powdered.

Inversion of the Womb.

This occurs from long-continued and excessive straining, and there hangs from the birthplace a large red or violet colored bag. Clean the



TO PREVENT INVERSION OF THE VAGINA.

bag thoroughly by the free use of warm water. If it is much swollen and enlarged, puncture slightly with the lance in several places to let out engorged blood. When sufficiently reduced, stop the effusion with cold water. Stand the cow so that her head will be permanently lowest in the stall. Let two assistants place a cloth underneath the bag and raise it to the level of the vagina. The operator with his right hand well oiled,

ter oiling the surface of the bag, places his hand against the point or bow of the bag farthest from the vagina, presses it steadily but gently back, and as far up the vagina as possible. With the left hand, also oiled, he now presses in the dependent portions in and up in a similar manner. The assistants follow the retracting bag until it is restored. A ball of tow is introduced to keep it in place, and a harness (as shown in the foregoing cut), which includes a raised stall. In any event the bowels should be restrained for a day or two by doses of laudanum. After twenty-four hours, if the pains have ceased and the animal is quiet, the ball of tow may be removed, and later the harness. A simplification of the harness will easily suggest itself to the operator.

Languid Labor.

If the presentation is all right and there is no obstruction, and the mouth of the womb is dilated but the labor pains are infrequent and weak, careful mechanical assistance should be given with the hands as heretofore stated, or try first full doses of ergot of rye, one to two ounces. It is often inefficient in cows and must be given in large doses.

Irritability and Straining.

If this is seen after birth, unless it subsides promptly, or if it show itself by repeated spasms and convulsions, give the following in a quart of warm milk: Chloroform and laudanum, each half an ounce. If the muzzle is dry and the horns hot, showing tendency to fever, the following will be better:

No. 10.
2 Oz. sweet spirits of nitre,
2 Oz. laudanum,
4 Oz. solution of acetate of ammonia.

This dose to be given in a quart of tepid milk every hour until relieved.

Temporary Paralysis.

Cows are frequently paralyzed in their limbs before parturition. If they does not regain the use of their limbs soon, or if they improve slowly, give the following:

No. 11.
2 Drachms powdered nux vomica,
2 Drachms sulphate of iron.

Give in a pint or two of gruel twice a day. Avoid all so-called cleansing drinks; they are generally injurious. When there is unusual debility the following will be indicated:

No. 12.
1 Oz. powdered anise seed.
1 Oz. " myrrh,
1 Oz. " allspice,
1 Oz. " cummin seed.

To be stirred in a quart of warm gruel as a drench.

If constipation is strong and persistent give:

No. 13.
½ Lb. sulphate of magnesia,
1 Oz. ground anise seed,
6 Oz. olive oil.

Give in a pint of gruel, and repeat daily if needed.

If there is strong relaxation with continued diarrhea, the following will be indicated:

No. 14.
2 Drachms powdered catechu,
1 Oz. " ginger,
30 Drops sulphuric acid,
1 Oz. laudanum.

Give in a quart of gruel, ale or weak whisky and water.

Or,

No. 15.
1 Oz. powdered ginger,
1 Oz. bicarbonate of soda,
1 Oz. laudanum,
1 Oz. decoction of oak bark.

Give several times a day in gruel or ale. Half this dose suffices for six months' calves, in similar conditions of the bowels.

Antiseptic washes for cleansing the vagina when the discharge is foul:

No. 16.
1 Quart clean wood tar,
2 Quarts boiling rainwater.

Stir, settle and pour off.

Another,

No. 17.
1 Lb. chloride of lime,
2 Gallons cool soft water.

Let it settle and pour off clear. A pint or two of either may be injected twice a day.

Abortion.

Abortion may be said to take place in cows when the fœtus is expelled thirty-five days before the normal period. It may occur from a variety

of reasons, and is much more common during the first half of the normal period than in the latter. It may be sporadic, that is, induced by accidental or local causes, as atmospherical influences, such as bad weather, and irregular seasons—severe suddenly succeeding mild weather. Cold storms, etc., are especially to be guarded against. As external causes, access by the male, explorations in vagina, surgical operations, throwing the animal down, bleeding, and bad or improper food, are among the most common of external causes. Excitement, fear, surprise, certain odors, contagion, are credited with playing an active part in this disability. Various diseases are also active parties in this direction. When cases occur simultaneously over wide extents of country and without known causation, it may be enzootic or epizootic. Ravages of this kind are not uncommon, and have attracted the attention of veterinarians.

Isolation.

When abortion is about to occur in a stable, at the very first symptom the animal should be entirely separated from the others, and the stall thoroughly disinfected with carbolic acid. In relation to measures preventive and remedial, these will be found in the list of properly labeled drugs to be kept for that purpose; they may be referred to at will. Isolation, however, is of absolute importance, lest the cause extend to other or perhaps all the cows in the stable. Ergot or other fungus spores in the food may be the cause. All possible causes should be carefully examined and remedied. A thorough cleansing of the stables should be made, and disinfectants and fumigants used. The following in the form of powder is good as a disinfectant in any case.

No. 18.

1 Bushel air-slacked lime,
1 Pound copperas,
½ Pound carbolic acid.
Mix.

A liquid form:

No. 19.

1 ½ Pounds chloride of aluminum,
1 Gallon water.
Dissolve. This is not poisonous.

Milk Fever.

This fever occurs from the first to the third day after calving; rarely later than this time. Select breeds and good milkers seem specially liable to attacks from this disorder.

The primary trouble in this disease is inflammation of the lining membranes of the womb, extending sometimes to its substance and adjacent parts; and in some cases involving the bowels themselves. Among its more remote effects

are affections of the brain, congestion of the spinal cord, apoplexy, blood-poisoning and death.

Causes.—Injury to the womb in calving; the retention of the after-birth; exposure to chill and cold by sudden changes of temperature, poor management, etc., may cause milk fever. At times a contagious character seems to attach to the disease, and many cows of the same herd suffer. It is also regarded as quite certain that a cow having once had the fever, will have it with her next calf. Over-feeding as the time of calving approaches is also prominent among the the supposed causes of the disease.

Authorities differ somewhat as to whether "milk fever" is identical with inflammation of the womb. Some think it is not identical; others, that it is the same disease in different stages, or different degrees of violence.

Symptoms.—The suspension of the milk secretions is one of the earliest indications of this trouble. The cow hangs her head, neglects to feed, ceases to chew the cud, moves her hind feet restlessly, staggers if she attempts to walk, looks wild, falls and cannot rise, sways her head from side to side. In this stage of disease the head is intensely hot. Power to see and to swallow is lost early in the disease; paralysis of the hind-quarters sometimes occurs; if not relieved, the breathing becomes hard and rapid; the pulse becomes faint and quick; and sometimes the animal dies in convulsions, or sinks away in stupor.

Usually the bowels do not move, and the bladder ceases to act. The turn of the disease for the better usually comes in thirty or forty hours, when the animal becomes rational, is able to arise, and the secretions all begin to resume their functions.

Treatment.—When trouble of this character is anticipated, preliminary treatment is strongly recommended for about a week before calving. This may consist in a purgative of

1 Lb. Epsom salts,
½ Lb. table salt,
½ Oz. ground ginger,

Mixed with suitable quantity of cold water, and sweetened with molasses.

At this time the cow's food should be of the lightest kind also, avoiding meal and grain. The cow should be carefully sheltered also. After calving, if fever be anticipated, give twenty-five drops of tincture of aconite in water, repeating the dose every six hours, till four doses have been given. This has a very direct effect upon the heart and circulation generally.

If the disease has set in clearly, but exhaustion is not apparent, free-bleeding is recommended by good authorities. When the pulse is weak and thready, however, and when exhaustion is apparent, bleeding is not called for, but a stimulant is required. Whisky may meet this case, or

1 Oz. carbonate of ammonia,
1 Pint of water.

If the cow be unable to swallow, a ball may answer better. It should be well oiled and pushed far back into the gullet. Active purges are always an advantage, and injections of soap and warm water may be used frequently when swallowing is impossible.

To relieve a heated head, cold water may be used. Carbonate of ammonia given as a ball may relieve swelling of the bowels. When the attack comes on, the following formula may be used as a laxative and sedative.

½ Drachm calomel,
2 Oz. laudanum,
1 Lb. castor oil.

Mix with hot water and molasses, and give in four doses at intervals of four hours.

For the exhaustion following the more acute stages of the disease, the following is highly commended:

1 Oz. spirits of turpentine,
½ Oz. carbonate of ammonia.

To be given in a quart of cold gruel.

Mammitis.

This disease is known as caked-bag, or garget, and is sometimes erroneously called milk fever. It is a disease of rare occurrence in the mare, but is commonly met with in cattle and sheep.

Definition.—It consists in acute inflammation of the whole or part of the mammary gland (udder).

Causes.—These are numerous; sometimes it is the result of external injury, such as blows of any description. Another common source of this disease is the cruel practice of "over stocking," which consists in the preparation of the cow for show or market, by allowing her to go unmilked until the udder becomes enormously distended with milk. This is done to give the gland a fine appearance. Cows giving no milk, when being fattened for the butcher, sometimes undergo a modified form of this disease; this is caused by some of the milk remaining in the gland and acting as an irritant.

Symptoms.—This disease seldom attacks the whole gland, but is usually confined to one or two quarters. The affected parts become hot, hard, swollen, tender, and red; the milk is curdled and whey-like, and usually mixed with blood. The constitutional symptoms depend upon the severity of the attack, the disease being often ushered in with rigors (trembling), followed by increased heat of the skin; the bowels are usually costive, but are sometimes unnaturally loose. The muzzle more or less dry, appetite slightly impaired, pulse quickened, together with general fever.

Treatment.—The first thing is to determine the cause, which must be at once removed. If the bowels are costive, a brisk purgative must be given—such as

one pound common salt mixed with one pound Epsom salts and half an ounce of ginger—the whole stirred in a quart of boiling water and given as a drench when cool—for sheep, about one-third of the above will suffice—for mares, about eight drachms of aloes with a drachm of ginger must be substituted for the salt, etc. After the purgative has done operating, diuretics in the shape of salt-petre, may be given night and morning, for about three days—dose, cattle, two drachms; mare, one drachm; sheep, half a drachm, in say a pint of water.

The local treatment, which is of great importance, consists in fomenting the part thoroughly with warm water, for half an hour at a time, three times a day, drying and hand-rubbing; after which, the parts may be smeared with olive oil, or goose grease. Poultices of various descriptions are also advantageously applied to the part, and may be made of spent hops, marsh-mallows, or some such substance, bearing in mind that the heat and moisture must be kept up, for the poultice to be effectual.

The animal must be fed upon food which is not calculated to produce milk, such as bran-mash, and the like. The milk must be frequently removed for a week or ten days. In serious cases, the nearest veterinarian should at once be consulted, as individual cases differ so much.

Treatment of Calves.

The Calf's First Need. — Every new-born calf needs early cleansing by the licking of its dam. If this is neglected, it may be induced by sprinkling salt on the calf. If after the naval string is severed (which the cow does with her teeth) it should bleed, it must be tied with a strong thread. If there be inflammation at the navel a mollifying ointment may be used; if a tumor appear, it may be lanced and poulticed (see Poultices, p. 785). The mother's milk is the best nourishment for the young calf. It also furnishes needed correction and regulation for the bowels and other organs.

Diarrhœa, etc.—Affections of this nature destroy many calves. Unsuitable food may induce it, or overheating of the dam. Two ounces of castor oil containing one teaspoonful of powdered ginger is a valuable corrective. It should be followed by gentian root tea mixed with two ounces of lime-water, a pint being given three or four times daily. Where this treatment and attention to the diet of mother and calf fail, resort may be had to strong teas of oak bark, or willow bark, with ginger added in either case. See also remedies under Diarrhœa in cattle, (p. 762).

Colic.—A form of colic, sometimes called the *Shoote*, is common among young calves, frequently affecting many in the herd. Isolation of the diseased animal is the first step in treatment. The disease shows itself in loss of appetite, listlessness, gripings, frequent watery discharges from the bowels, exhaustion and death. The prompt administration of a mixture of eggs, flour and linseed oil is desirable. One drachm of essence of ginger and two drachms of laudanum, mixed in gruel, may be given at intervals until relieved.

Croup.—Young calves if exposed to dampness, fogs, etc., are liable to inflammation of the upper portion of the throat and the formation of a whitish substance or false membrane, on these parts. This disorder is shown by a hoarse cough, running at the nose, and in breathing by a whistling or croaking noise. All these symptoms increase as the disease progresses. Mild purges must be used at once; small quantities of saltpeter should be given in drinking water; and the vapor of slacking lime may be inhaled to relieve the throat of the false membrane.

Lung Worms.—This title designates the white, thread-like, parasitic worms, which are often found in the wind pipe, bronchial tubes and lungs of calves and lambs. Low, marshy pasture lands, especially in August and September, are conducive to this disease. The accumulation of these parasites is sometimes so great, as to choke the afflicted animal to death. A hoarse, husky, bronchial cough, loss of flesh and difficulty in breathing, are the more evident symptoms. Sometimes the worms may be seen in the saliva or mucus which is coughed up; but where the disease is suspected, careful examination for them should be made.

Separate the afflicted animals from the herd; place them in a warm, dry stable; burn sulphur so that they shall inhale its fumes, which are destructive to the parasites. A half ounce of turpentine may be given daily in gruel. Half a pint of lime-water with a teaspoonful of turpentine, given once a day, is very effective. Relief from the disease should be followed with a tonic treatment, giving twice a day a tablespoonful of the following mixture:

½ ounce Oil of Turpentine,
2 Drachms Carbonate of Iron,
4 ounces Solution of Gum-Arabic.

CHAPTER III.

INFECTIOUS, CONTAGIOUS AND EPIDEMIC DISEASES.

PNEUMONIA.——HISTORY.——ITS MALIGNANT CONTAGIOUSNESS.——DEFINITION.——HOW THE INFECTION ENTERS THE SYSTEM.——HOW LONG IS A DISEASED ANIMAL INFECTIOUS.——HOW TO KNOW IT.——WHAT TO DO.——TEXAS FEVER.——HOW TO KNOW IT.——BLOODY MURRAIN.——ITS MALIGNANT CHARACTER.——PREVENTIVES.——WHAT TO DO.——FOOT AND MOUTH DISEASE.——CONTAGIOUS PLEURA.——LICE ON CATTLE.——FOULS IN CATTLE.——HORN-AIL, OR HOLLOW HORN.——CHOKING.——DIARRHŒA, DYSENTERY, ETC.——COW POX.

Infectious, Contagious and Epidemic Diseases.

Among the most terrible of the diseases ever imported into the United States is *pleuro pneumonia contagiosa* known scientifically by a large number of names, but now generally designated as Bovine Pneumonia Plague, and the Lung Plague in cattle; Texas Fever, known also as Spanish Fever and Texas Cattle Disease, and scientifically as Splenic Fever; Bloody Murrain, also known as "Black Quarter" (Quatran) and "Quarter Ail," is known among veterinarians by its French name *Charbon*, and also as Contagious Anthrax. Thus these will be all that it will be necessary to treat at considerable length as among contagious diseases.

Contagious Pleuro-pneumonia.

This disease which has lately excited so much attention in the United States from its violent outbreak in the Atlantic States, and the well grounded fear that for the lack of national legislation it might overrun the whole country, is the most malignant with which the farmers of the country have had to deal. Once fairly established in the West there

will be no possible means of eradicating it. It will remain a fixture forever.

History.

This disease has been known in Europe and Asia from the remotest civilization, and has been treated since the first gathering together of cattle in large herds. Aristotle, evidently writing of this disease three hundred years before Christ, describes the symptoms accurately, inasmuch as he says: "The cattle *which live in herds* are subject to a malady during which the breathing becomes hot and frequent; the ears droop and they cannot eat. They die rapidly, and the lungs are found spoiled." Greek and Roman writers also describe what appears to be the same disease, and Valentine particularizes a fatal lung plague which evidently corresponds to this malignant and terrible scourge.

Its Malignant Contagiousness.

Unfortunately veterinary science has never yet discovered a remedy. Its attack is so insidious, and often occupies so long a time in the stage of incubation, that a whole herd may be infected almost before it is known. As in the case of all German plagues, nothing is known of its origin; but just as soon as it is apparent that a case is being well developed, the only safe plan is prompt killing, deep burying of the carcass, skin and all, and the free use of quick-lime (a barrel to the carcass) before being covered up.

Definition.

This disease is defined as follows:

A specific contagious disease peculiar to cattle, and manifested by a long period of incubation (ten days to three months) by a slow insidious onset, by a low type of fever, and by the occurrence of inflammation in the air-passages, lungs and their coverings, with an extensive exudation into the lungs and pleuræ.

That the infection is carried by the animals wherever they go is certain. That it is carried in the air to a very considerably extent seems altogether probable. That it is carried by inoculation is well demonstrated; and also by contact of diseased portions of an animal with the membranes of a well one, is as certain as that the contagion is carried by attendants on sick animals and is proved almost beyond controversy. That the contagion will hold in stables for months even after being thoroughly cleaned and washed with disinfectant liquids, is proved just as clearly as that it

may be carried by the many. That it may be taken in pastures and with fodder is too well authenticated to leave room for doubt.

Vitality of the Virus.

There is much difference of opinion with regard to the power of the virus to resist ordinary destructive influences. In many cases the free exposure of an infected place for three or four months to the action of the air has purified it so that fresh stock have been introduced with impunity. On the other hand, instances can be adduced in which cattle have been infected by being placed in stables in which cattle had not been kept at least four months previously. Other things being equal, it will be preserved longest where it has been dried up and covered from the free access of the air. Thus in very dry and close buildings, in those having rotten wood-work, or deep dust-filled cracks in the masonry, and in those with a closed space beneath a wooden floor, it clings with the greatest tenacity. Again, when the buildings contain piles of lumber, litter, hay, fodder, or clothing, the virus is covered up, secreted and preserved for a much longer time than if left quite empty. In these last it is preserved just as it is in woolen or other textile fabrics, and carried from place to place by human beings.

As carried through the air, the distance at which the virus retains its infecting properties varies much with varying conditions. The author has seen a sick herd separated from a healthy one by not more than fifteen yards and a moderately close board fence of seven feet high, and in the absence of all inter-communication of attendants, the exposed herd kept perfectly sound for six months in succession. On the other hand, infection will sometimes take place at a much greater distance without any known means of conveyance on solid objects. Roll quotes 50 to 100 feet, while others claim to have seen infection at a distance of 200 and 300 feet. But it may well be questioned whether in such cases the virus had not been dried up on light objects, like feathers, paper, straw, or hay, which could be borne on the wind. This, from being in thicker layers, would escape the destruction that would have befallen it had it been carried in the air only as invisible particles.

How the Infection Enters the System.

The seat of the disease, its progress, and the result of all attempts at inoculation, favor the presumption that the virus is usually taken in with the air breathed. Not only are the lesions concentrated in the lungs, but they begin with cloudiness and swelling of the smaller air-tubes and surrounding connective tissues.

The exudation into the interlobular tissue, the congestion of the lung tissue itself, and the implication of the lung covering, are secondary phenomena. In other words, the disease begins where the inspired air must lodge the germs. Thus the inoculation of the virulent lung products on distant parts of the body of a sound beast rarely determines the characteristic lesions in the lungs, in lieu of which it induces in the seat of inoculation an exudation less abundant, as might be expected from the greater density and resistance of the integument, but which can, like the morbid lung products, be inoculated on sound animals with protective effect. It seems probable that the poison is multiplied in both cases, but that the special loose and susceptible texture of the lung renders its production incomparably more abundant, as the continuous ingress and egress of air through the diseased organ renders it immeasurably more infecting.

How Long a Diseased Animal is Infectious.

Proof is wanting as to the infectious nature of the disease during the incubative stage. If negative evidence were of any value in a case like this, it would be easy to adduce cases in which the removal of an animal as soon as it showed symptoms of the plague had apparently saved the rest of the herd. In other cases, the malady has been eradicated from a herd by careful watching, and the prompt removal of every animal as soon as sickness appeared. The period of greatest virulence is that at which the fever runs highest and when the lung is being loaded with the morbid exudation.

But it must not be inferred that with the subsidence of the fever the danger is removed. It is a matter of every day observation that animals which have passed through the fever, that are now thriving well, or giving a free supply of milk, and to ordinary observers would appear in perfect health, retain the power of transmitting the disease to others. This may continue for three, six, nine, twelve, or, according to some, even fifteen months after all signs of acute illness have disappeared. This is easily explained. The tendency of the disease is to interrupt the circulation in the most severely affected parts of the lungs; the exudation around this becomes developed into a tough fibrous envelope, which closes off the dead mass from the adjacent lung and from all communication with the external air. The dead and imprisoned mass now undergoes a process of breaking down, liquefaction, and absorption, commencing at the surface, and slowly advancing towards the centre. The encysted portion of the dead lung is one mass of infecting material, and as it undergoes no change except that of liquefaction, and exhales at no time any putrid odor, it remains infectious so long as it retains the solid form. At the outset more than half a lung may be thus encysted, and five or six months after alleged

recovery we still find masses of from one to two pounds weight waiting for the slow process of solution. Whenever there are indications of the existence of such encysted masses, the animal should be looked on as infectious, and disposed of as summarily as if in the acute stages of the disease. Mr. Law gives the following rules when the disease is suspected:

1. Remove all litter, manure, feed and fodder from the stables; scrape the walls and floor—wash them if necessary; remove all rotten wood.

2. Take chloride of lime one-half lb., crude carbolic acid, 4 ozs., and water, 1 gal; add freshly-burned quick-lime till thick enough to make a good whitewash; whitewash with this the walls, roof, floors, posts, mangers, drains and other fixtures in the cow stables.

3. Wash so as to thoroughly cleanse all pails, buckets, stools, forks, shovels, brooms and other movable articles used in the buildings; then wet them all over with a solution of carbolic acid 1-2 lb., water 1 gal.

4. When the empty building has been cleansed and disinfected as above, close the doors and windows, place in the center of the building a metallic dish holding 1 lb. flowers of sulphur; set fire to this and let the cow-shed stand closed until filled with the fumes for at least two hours. The above should suffice for a close stable capable of holding twelve cows. For larger, or very open buildings, more will be required.

5. The manure from a stable where sick cattle have been kept, must be turned over and mixed with quicklime, two bushels to every load; then hauled by horses to fields to which no cattle have access, and at once plowed under by horses.

6. The pits, where the manure has been, must be cleansed and washed with the disinfectant fluid ordered for the building.

7. The surviving herd should be shut up in a close building for half an hour, once or twice a day, and made to breathe the fumes of burning sulphur. Close doors and windows, place a piece of paper on a clean shovel, lay a few pinches of flowers of sulphur upon it, and set it on fire; adding more sulphur, pinch by pinch, as long as the cattle can stand it without coughing. Continue for a month.

8. Give two drachms powdered copperas (green vitriol) daily to each cow in meal or grains; or, divide 1 lb. copperas into 50 powders, and give one daily to each adult animal.

9. Do not use for the surviving cattle any feed, fodder or litter that has been in the same stables with the sick. They may safely be used for horses and sheep.

What to Do.

There is only one remedy—entire isolation of the herd infected. The prompt killing and slashing of the hides of diseased animals, deep burial,

and covering the bodies with quick-lime. It may be stamped out only by the free use of the poll-axe, and the thorough disinfection by the most severe means of the premises, utensils and attendants. It is one of those cases where heroic treatment is of supreme value.

How to Know It.

The symptom most easily known in the early stage is an increased temperature of the body. If a clinical thermometer be introduced into the rectum of a beast in an infected district, and an abnormal heat is ascertained, it is safe to suspect the disease; therefore send for a veterinarian at once. Next a slight cough will show itself; the hair will be erected along the back; there may be shivering and always tenderness of the back when pinched; the breathing and pulse is accelerated; the bowels are costive, rumination is irregular. The urine is scanty and high colored, the appetite fails, the milk-flow is diminished, the nose will be alternately moist and dry. The horns and other extremities will be alternately hot and cold. In the field, the sick animals will separate from the herd. All the symptoms become more and more apparent until the animal remains in a fixed posture, the head rigidly extended, the mouth open, at every inspiration a moan, until at length the animal succumbs, a loathsome and noxious mass of contagion.

What to Do.

A resort to remedies should not be had unless the animals are taken early in hand, and can be isolated in a building far from any herd. It will not pay except in the case of thorough-bred or otherwise valuable stock. This is especially the case in the West, if that section should be unfortunate enough to import the disease. Prof. Gamgee, who made an elaborate report for the Government in 1871, strongly and wisely condemns purgatives and bleeding, but believes the disease may be checked, if taken in time, by isolating the whole herd, and depending on active internal astringents. He advises daily doses of sulphate of iron, one-half to one drachm to the bullock, mixed with an equal weight of linseed and coriander seeds, given in bran to disguise it; this he has found to mitigate the cough, followed by the disappearance of the disease.

In the second stage of the disease, he advises light but nutritious food, copious warm water injections, and the following stimulant:

No. 20. ½ Oz. carbonate of ammonia,
1 Qt. linseed oil.

Mix, and give this dose two or three times a day. When only one lung is involved, recovery occasionally takes place; when both are involved, there is little or no hope. For cough and debility during convalescence, he advises the following tonic:

No. 21.
¼ Oz. oxide of magnesia,
½ Oz. iron filings, fine,
1½ Oz. tincture of gentian,
1 Pt. water.
To be given daily.

Another prescription is recommended—

No. 23.
1 Drachm carbolic acid,
1 Pint water
To be given as a dose three times a day.

The reader will see, upon a careful study of the foregoing, that but one prescription—killing—is the only safe plan.

Texas Fever.

This disease, now called Splenic Fever, resembles in some of its phases the terrible Rinderpest of Asiatic Russia, but it is far less malignant and less contagious. It also disappears with the first frost, being effectually stamped out during the Winter, not to be again seen until again reintroduced by the passage of Texas cattle. So again it is not given by our Northern cattle to other beasts. The disease has its home on the coast of Texas, but how it originated is not clearly known. After death the spleen is found greatly enlarged and softened, the kidneys broken, dung and the blood fluid.

How to Know It.

The period of incubation extends over four or five weeks after the poison has been introduced. The fever will at first be moderate, the temperature as shown by a clinical thermometer, introduced into the rectum, will be 103 to 107 degrees. Then follows dullness, cough, trembling, jerking of the muscles, drooping of the head, arching of the back. The horns are hot, rumination ceases, and the appetite not good. The eyes become glassy and watery, the urine deep red or black from the blood contained; the dung is hard and coated with blood; the mouth and rectum will be a dark red or copper color; and the animal dies in a stupor or convulsions.

Gamgee always found present in the examination of nearly 5,000 animals that the fourth stomach was distinctly inflamed and the spleen

always enlarged and of a purplish color—on cutting the pulp oozing out soft like currant jelly. Hence the name, "Splenic Fever."

What to Do.

Put the animal in a roomy stable with good ventilation, and give soft food. As an internal remedy give

No. 23. ½ Oz. chlorate of potash,
1 Oz. tincture of chloride of iron,
1 Quart water.
Mix and give as a dose to to be followed two or three times a day.

The most dangerous symptoms being passed, give plentiful food and the following tonic.

No. 24. ½ Oz. sulphate of iron,
1 Oz. tincture of ginger,
1 Qt. water.
This amount twice daily.

Professor Gamgee does not regard medical treatment as being hopeful. In addition he advises that the limbs be well rubbed, and the bowels moved by injections. During the first two or three days he recommends ounce doses of laudanum, and later as a stimulant the following:

No. 24. ½ Oz. sulphuric ether,
4 Oz. of acetate of ammonia.
Give in a quart of linseed tea three times a day.

Bloody Murrain.

Contagious Anthrax, known also as charbon, black leg, black quarter, black tongue— is so called because the parts attacked turn black, owing to decomposition of the blood. It arises undoubtedly from contagion, eating bad food, pasturing on swamp lands in summer, drinking stagnant water, etc. Whatever the poison, certain it is it has wonderful tenacity of life; every part of the animal will carry it, even the excrement. Flies will carry it, a yoke worn by a diseased ox retains it. Even alcohol is said not be able to kill the poison. Fortunately it rarely occurs in its truly malignant form. There are many types of the disease attacking particular parts. In the tongue it is known as black tongue, or blain; in the throat as putrid sore throat. When it attacks the bowels it is called bloody murrain.

Its Malignant Character.

In this disease it must be remembered that in its malignant form it attacks not only cattle and horses, but all the herbivora, swine and birds. It is communicable to other and different animals by inoculation, showing itself in different forms, but all characterized by the breaking down of the blood globules, rupture of tissues and letting out blood and albuminous fluids, with gangrene, yellow or brown mucous membrane, enlargement and sometimes rupture of the spleen, and a very high death rate. Immense numbers of human beings have died first and last from eating the flesh of diseased animals. This is especially the case among the Tartars, who do not refrain from eating even the flesh of anthrax horses. As many as a thousand persons are recorded as having died in six weeks in San Domingo from eating the flesh of such diseased animals. Mosquitoes, and other biting insects are supposed to cause breaking out of the malignant pustule in man, from the fact of its always arising on exposed portions of the body. In relation to the various manifestations of the malignant anthrax Professor Law says:

"Malignant anthrax may be manifested by external disease, or swelling or without such appearances. To the first class belong the carbuncular, erysipelas, of sheep and swine, malignant sore throat of hogs, gloss-anthrax or black tongue, black quarter or bloody murrain, the boiled plague of Siberia, and the malignant pustule of man. To the second belong all those forms of disease in which there are the specific changes in blood, with engorgement of the spleen, blood-staining, and exudations into internal organs only.

Preventives.

Upon the first intimation of the disease the well animals of the herd should be removed to clean, new pasture, where there is pure water. Avoid all bleeding, purging, and lowering medicines. The animals must be kept up. So all local applications to the swellings seem useless. A seton, composed of a yard of broad coarse tape, inserted in the dewlap turned every day and smeared with irritating ointment might prove beneficial. This should remain in from four to six weeks.

Youatt and others advise the following:

No. 25. 2 to 4 Drachms chloride of lime,
1 Oz. prepared chalk,
2 Drachms laudanum.
Mix and give in a pint of warm gruel every two or three hours.

Recent French authors, in treating the malignant form of the disease,

recommend quinine, one or two drachms, repeated every two or three hours in severe cases. Also hypodermic injections of a solution of iodine as follows:

No. 26. 2 Grains iodine,
5 Grains iodide of potassium,
1 Oz. water.

Use a syringeful every hour in severe cases. In extreme ones, it is advised that this be thrown directly into the veins; also that the strength be kept up by stimulants; among those recommended most strongly is carbonate of ammonia.

Blain.

When bloody murrain attacks the tongue it is called blain. In the case of blain it is recommended to open the pustule freely from end to end, with a sharp lancet, before the poison has been absorbed. Treat the same surface freely with the following:

No. 27. 20 Grains chloride of lime,
1 Oz. water.

Mop the parts freely.

Sulphuric or nitric acid, nitrate of mercury, lunar caustic, and other strong caustics, are equally good. When it may be accomplished, burning with a hot iron is advised.

Foot and Mouth Disease.

One other contagious disease will be necessary to be treated of here, as beginning to be of common occurrence, having prevailed more or less since its introduction into the United States in 1869. This is epizootic aptha, generally known as foot and mouth disease. Although a contagious febrile disease occurring in cattle and sheep, and communicable by transmission to swine and even man, it is fortunately rarely fatal, and is characterized in animals by an eruption of small blisters in the mouth, and between the clefts of the hoofs, and along the upper margin of the coronet. It is a specific poison of obscure origin, remaining in the system from one to four days before producing its characteristic symptoms.

How to Know It.

There is an increase of temperature in the body, followed by an eruption of small blisters, of the size of a dime, situated on the tongue, the roof of the mouth, inside the lips, and occasionally on the udder. The

blisters in the cleft of the hoofs and around the coronet and heels, are identical with the others, but smaller.

When the disease is mild, it is easily cured by daily applications of a portion of the following, applying by means of a swab or sponge:

2 Oz. powdered golden seal, 1 Oz. tincture of matico, 4 Oz. honey.

When the disease is violent and of long standing, it is apt to extend through the whole course of the alimentary canal. The method of cure, in this event, is by tonics and astringents. The remedies are tincture of matico, golden seal, and sulphur, in the following proportions:

4 drachms tincture of matico, 2 drachms powdered golden seal.
2 drachms sulphur, 1 pint water.

The patient's diet should consist of oatmeal gruel, slightly alkalized with hyposulphite of soda.

Malignant Catarrh.

MALIGNANT CATARRH—SLOUGHING

Caused by feeding in damp, cold situations, and feeding on marshes in peculiar seasons. Low, wet river bottoms are most subject to give it to stock. The disease somewhat resembles the Russian cattle plague, but is not usually contagious. Professor James Law gives symptoms and treatment as follows:

A slight diarrhœa may be followed by costiveness, the dung being black, firm and scanty. The hair is rough and erect; shivering ensues; the head is depressed; the roots of the horns and forehead hot; eyes sunken, red, watery, with turbidity in the interior and intolerance of light; muzzle dry and hot; mouth hot with much saliva; the membranes, mouth, nose and vagina bluish-red; pulse rapid; impulse of the heart weak; breathing hurried; cough; urine scanty and high colored, and surface of the body alternately hot and cold. In twenty-four hours all the symtoms are aggravated; the nose discharges a slimy fluid; forehead is warmer and duller on percussion; the mouth covered with dark red blotches, from which the cuticle soon peels off, leaving raw sores; appetite is completely lost; dung and urine passed with much pain and straining, and there is generally stiffness and indisposition to move. From the fourth to the sixth day ulcers appear on the nose and muzzle, swellings take place beneath the jaws, chest and abdomen, and on the legs the skin may even slough off

in patches; a fœtid saliva drivels from the mouth and a stinking diarrhœa succeeds the costiveness. Death usually ensues from the eighth to the tenth day, preceded perhaps by convulsions or signs of suffocation.

The treatment is to clean the bowels with the following:

No. 28. 1 Pint olive oil,
1 Oz. laudanum.

In eight or ten hours, if it do not operate, give another. Follow this with diuretics, sweet spirits of nitre in half-ounce doses, and also with antiseptics, potassa chlorate, in doses of one-quarter drachm. Wet cloths should be kept on the head: the mouth and nose sponged with quite a weak solution of carbolic acid. Give as food only soft mashes.

Lice on Cattle.

All cattle, and especially those in poor condition, are liable to attacks of lice of various species, which will propagate very rapidly, soon infesting other stock and even the stables and barns themselves. Treatment must, therefore, be directed promptly at the animals, and their surroundings also. Stables should be cleaned and whitewashed. Their scratching places should be coated with petroleum or coal tar.

For treatment of the cattle, poisonous substances must be shunned carefully, as their habit of licking themselves would result in their injury. One of the simplest preparations is a strong solution of tobacco leaves saturated with rock salt. This may be applied thoroughly on several occasions at intervals of three or four days. Repetition is necessary to the extirpation of the young, which may be hatched after the first application. If alcohol be used in the decoction of tobacco leaves it will destroy the nits as well as the lice, and prove the quickest relief from the pests.

A good preparation which will remain well upon the hide is this:

Linseed oil, 4 parts.
Common creosote, 1 part.

An ointment of cayenne pepper, or Scotch snuff mixed with hog's lard, well rubbed in, will be found very effective. Especially look out for vermin in young stock, or stock in poor condition.

Fouls in Cattle.

Foul claw, or foul in the foot, is a disease characterized by inflammation and suppuration of the substance in the cleft of the hoof. Sometimes it extends to the entire foot, and even includes the whole leg, causing fever, failure, and death in some cases. Usually it affects the hind feet. Foreign substances between the claws, excessive weight and strain upon the foot, or a scrofulous condition of the system may cause this trouble. Its best treatment consists of careful cleansing of the sore; poulticing, if much inflamed, and

astringent applications. In cleansing, a syringe may be needed, using a solution of carbolic acid. Cloths saturated with the solution should be pressed into the opening and bound there. A clean stable, or a dry pasture ground are essential. For a wash, use:

Carbolic acid, one drachm,
Water, six ounces.

For an ointment, use:

Oil of turpentine, four ounces;
Lard, four ounces;
Powdered sulphate of copper, one ounce.

Horn-Ail, or Hollow Horn.

What is popularly known by these names is not a disease originating in the horns or located there. A peculiar coldness of the horns is one of its symptoms, but the cause of the disease is a degenerated condition of the blood, resulting from other diseases, or from exposure, foul air, unclean stables, poor food, bad water, etc. Uniformity of food may produce these ill conditions.

General debility, loss of flesh, rough, lousy hide, loose or constipated bowels, whiteness of tongue and cold horns are the usual symptoms.

All local treatment of the horns is worthless. Good food, cleanly and comfortable housing and treatment for vermin if they be present are the first requisites. Cleansing the bowels and tonic treatment are then in order.

Use for one week daily in dry food, the following:

Sulphate of iron, two drachms;
Powdered nux vomica, one drachm;
Powdered gentian, one ounce.

Choking.

For detailed directions for determining and treating this dangerous difficulty, see under Horses, pages 474–476.

Diarrhœa, Dysentery, etc.

The symptoms of these disorders are so fully understood as scarcely to need description. Reference may be made, however, to the full discussion covering both horses and cattle given in Chapter VI., Diseases of Horses, pages 362–364. See Recipes, No. 67, 69, page 790, and "Astringents," page 502.

Cow-Pox.

This disorder is akin to small-pox in man, though it is far less to be dreaded. It sometimes appears without discoverable cause, but inoculation or contact with the disease is regarded as essential to its propagation. It begins with slight fever; pimples then appear on the teats, udder and belly; the milk diminishes, the cow droops and its appetite fails. It is not uncommon for several crops of pustules to form, break, and dry up. The sick animal should be isolated and subjected to a mild, sedative treatment, keeping the

bowels free, but not loose. See "Cathartics," page 502; and "Sedatives," page 506. The teats may need washing with warm water or a healing lotion. Cow-pox is seldom severe, and scarce ever fatal, but its inoculation may readily be taken by man in handling the sick cow.

CHAPTER IV.

MEDICINES AND INSTRUMENTS—WHAT TO KEEP.

I. DISSECTION.—II. ACTION OF MEDICINES.—III. MEDICINES TO BE KEPT, AND DOSES.—IV. SIMPLE AND VALUABLE RECIPES.—V. FORMS OF CLYSTERS.—VI. INFUSIONS.—VII. ANTI-SPASMODICS.—VIII. FOMENTATIONS.—IX. MUCILAGES.—X. WASHES.—XI. POULTICES.—XII. FUMIGATIONS.—XIII. TINCTURE FOR WOUNDS.

I. Dissection.

In the dissection of cattle the axe and meat saw, and butcher's knife must be largely depended on, in the hands of farmers, since all that is necessary is to get at the diseased parts to note their appearance and the seat of the disease, the symptoms having been previously carefully noted. This matter has been treated of in diseases of the horse, chapter XIX., article Dissection, to which the reader is referred. See page 509.

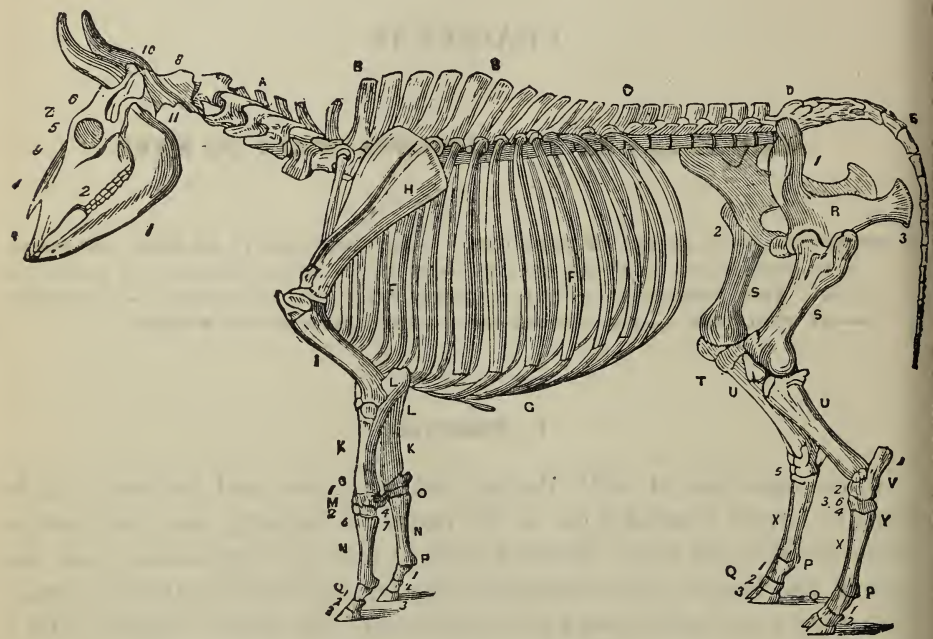
II. Action of Medicines.

The action of medicines, doses for horse, ox, sheep and swine is also treated of in chapter XIX., of the horse, together with much other valuable matter applicable to animals generally. See pages 500–516.

III. Medicines to be Kept, and Doses.

It will not be necessary to keep more than a small stock of the medicines in most common use, or such as may be required in an emergency. Those adapted to the horse, will, as a rule be also adapted to other stock. In chapter XIX. a pretty full list will be found, with the appropriate doses for cattle, sheep and swine, as well as the horse; also the proper proportionate dose for animals of various ages up to the adult. It will not be necessary to repeat them here. See page 511.

For the purpose of enabling our readers to become familiar with the bony structure of cattle we give an illustration of the skeleton of the ox with the correct names of the various parts as known in veterinary science. It will be found valuable for reference, not only to the student in veterinary art, but also to every one who proposes to keep and breed cattle.



SKELETON OF THE OX.

Explanation of Cut.—*A*—Cervical Vertebrae. *B B*—Dorsal Vertebrae. *C*—Lumbar Vertebrae. *D*—Sacrum. *E E*—Concygeal Bones. *F F*—Ribs. *G*—Costal Cartilages. *H*—Scapula. *I*—Humerus. *K K*—Radius. *L*—Ulna. *M*—Carpus or Knee. 1—Scaphoid. 2—Semilunar. 3—Cuneiform. 4—Trapezium. 5—Trapezoid. 6—Os Magnum. 7—Unceiform. 8—Pisiform. *N N*—Large Metacarpel or Cannon. *O*—Small Metecarpel. *P P*—Sesamoid Bones. *Q Q*—Phalanges. 1—Os Suffraginis or Pastern Bone. 2—Os Coronae. 3—Os Pedis. *R*—Pelvis. 1—Illium. 2—Pubis. 3—Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hocks. 1—Os Calcis. 2—Ostragulus. 3—Cuneiform Magnum. 4—Cuneiform Median. 5—Cuneiform Parvum. 6—Cuboid. *X*—Large Metatarsal. 1, 2, 3—Phalanges. *Y*—Small Metatarsal. *Z*—Head. 1—Inferior Maxilla. 2—Superior Maxilla. 3—Anterior Maxilla. 4—Nasal Bone. 5—Molar. 6—Frontal. 7—Parietal. 8—Occipital. 9—Lachrymal. 10—Squamous. 11—Petrous.

In comparing the skeleton of the ox with that of the horse, we can readily perceive the difference in the length of the limb and neck possessed by the latter. Speed seems to have been an object at the creation, and as the body was elevated the neck needed proportionate length in order to feed. The body of the horse corresponds to a square, while that of the ox to a long rectangle. The limbs of the ox are straighter than those of the horse, much less speed being demanded. The ribs of the former are both longer and larger than those of the latter, greater protection with sluggardness of movement being required. In the head of the ox we find the two plates or tables noticed in the horse; in the latter, however, they lie close together, while in the former, as in all horned animals, there is considerable space between them. This diversity creates a number of cells, having bony ridges passing from the inner to the outer plate, which secures the firmness of the parts. These cells form roomy and strong sockets for the horns. The cavity containing the brain of the ox is about one-fourth the size of the other parts of the skull; the organs of mastication and those of smell taking up the remaining portions. In cattle the frontal bones extend from the nose to the superior ridge of the skull, presenting a flat, irregular surface, totally bare of any muscular or fleshy covering. The weapon of defense and offense employed by cattle is the horn and nature has securely based it and rendered it effective by this expanse of the frontal bone. There is the same division in the center of the frontal sinuses as in the horse, but the perfection of division between the nostrils is wanting. Commencing about half way up the nose, the septum is wanting at the lower part, and the two nostrils are, as it were, thrown into one; the frontal sinuses connect with the nasal, thus forming a continuous cavity from the muzzle to the horn, and from one muzzle to the other. In polled cattle the frontal bone holds the same situation—reaching from the nasal bones to the parietal ridge—but as they were not designed for the base of horns, they narrow off towards the poll. The temporal bones in cattle are small, deep in the temporal fossa and destitute of the squamous structure. The occipital bone is, in the ox, deprived of almost all the importance attached to it in the conformation of the horse. The sphemoid and ithmoid bones are in the same relative position.

IV. Simple and Valuable Medical Recipes for Cattle.

Dr. G. H. Dadd, M.D., V.S., a medical practitioner of repute, and celebrated as a veterinary surgeon, up to the time of his death, some fifteen years ago, attributed much of his success to not being bound by any rigid rules of practice. Thus he, while having been bred under the Allopathic system of medicine, used largely of botanical agents, as in

fact do all our best physicians now, more largely than formerly. In the appendix to his work on the diseases of cattle he gives a series of recipes under appropriate headings, which we reproduce in a somewhat different and condensed form, as being at the same time simple and efficacious. In his observations on the action of medicine, and external agents on the animal body, he says, that warmth and moisture always expand it, and bayberry bark, tannin, and gum catechu always contract it; and that these agents have these effects at all times (provided, however, there be sufficient vitality in the part to manifest these peculiar changes) and under all circumstances. If a blister be applied to the external surface of an animal, and it produces irritation, it always has a tendency to produce that effect, whatever part of the living organism it may be applied to. So alcohol always has a tendency to stimulate, whether given by the mouth or rubbed on the external surface, it will produce an excitement of nerves, heart and arteries, and of course the muscles partake of the influence. Again, marsh mallows, gum acacia, slippery elm, etc., always lubricate the mucous surfaces, quiet irritation, and relieve inflammatory symptoms.

It follows, of course, 1st. That when any other effects than those just named are seen to follow the administration of these articles, they must be attributed to the morbid state of the parts to which they are applied; 2d. That a medicine which is good to promote a given effect in one form of disease, will be equally good for the same purpose in another form of disease in the same tissue. Thus, if an infusion of mallows is good for inflammation of the stomach, and will lubricate the surface, and allay irritation in that organ, then it is equally good for the same purpose in inflammation of the bowels and bladder. What we wish the reader to understand is this: that a medicine used for any particular symptom in one form of disease, if it be a sanative agent, is equally good for the same symptom in every form.

The medicines we recommend owe their diuretic, astringent, diaphoretic and cathartic powers to their aromatic, relaxing, antispasmodic, lubricating and irritating properties; and if we give them with a view of producing a certain result, and they do not act just as we wish, it is no proof that they have not done good. The fact is, all our medicines act on the parts where nature is making the greatest efforts to restore equilibrium; hence they relieve the constitution, whatever may be the nature of their results.

V. Forms of Clysters.

Laxative clyster:

No. 29. 3 or 4 Quarts warm water,
8 Ounces linseed oil,
1 Table-spoonful common salt (fine).

Another:

No. 30. 4 Quarts warm water,
1 Gill soft soap,
½ Table-spoonful fine salt.

Useful in obstinate constipation, "stoppage," or whenever the excrement is hard and dark colored.

Emollient clyster:

No. 31. 2 Ounces slippery elm bark,
2 Quarts boiling water.

Simmer over the fire a few minutes, strain through a fine sieve, and inject, when nearly cool. The following articles may be substituted for elm: flaxseed, lily roots, gum arabic, poplar bark, Iceland moss.

Use.—In all cases of irritation and inflammation of the intestines and bladder.

Stimulating clyster:

No. 32. 3 Quarts of thin mucilage of slippery elm or linseed tea,
1 Teaspoonful African cayenne, pure.

Another:

No. 33. ½ Table-spoonful powdered ginger,
3 Quarts boiling water.

When cool, inject.

Use.—In all cases when the rectum and small intestines are inactive and loaded with excrement, or gas.

Anodyne clyster:

No. 34. 1 Ounce lady's slipper (cypripedium),
1 Ounce camomile flowers,
3 Quarts boiling water.

Let the mixture stand a short time, then strain through a fine sieve when it will be fit for use.

Use.—To relieve pain and relax spasms.

Diuretic clyster:

No. 35. 3 Quarts linseed tea,
1 Table-spoonful oil of juniper.

Or, substitute for the latter, cream of tartar, half an ounce.

Use.—This form of clyster may be used with decided advantage in all acute diseases of the urinary organs. This injection is useful in cases of red water, both in cattle and sheep; and when the malady is supposed to

result from general or local debility, the addition of tonics (golden seal or gentian) will be indicated. Their active properties may be extracted by infusion.

Astringent clyster:

Take an infusion of hardhack, strain, and add a table-spoonful of finely-pulverized charcoal to every three quarts of fluid.

Another is an infusion of witch hazel.

Another:

No. 36. 1 Table-spoonful powdered bayberry bark,
3 Quarts boiling water.

When cool, it is fit for use.

Use.—Astringent injections are used in all cases where it is desired to contract the living fibre, as in scouring, dysentery, scouring rot, diarrhea, bloody flux, falling of the womb, fundament, etc.

Nourishing clysters:

Nourishing clysters are composed of thin gruel made from flour, etc.

Injection for worms:

Make an infusion of pomegranate (rind of the fruit), and inject every night for a few days. This will rid the animal of worms that infest the rectum: but if the animal is infested with the long, round worm (*teres*), then half a pint of the above infusion must be given for a few mornings, before feeding.

Another for worms:

No. 37. 1 Ounce powdered lobelia,
1 Handful wood ashes,
3 Quarts boiling water.

When cool, it is fit for use.

VI. Infusions.

These are made by steeping herbs, roots, and other medical substances in boiling water. No particular rules can be laid down as to the quantity of each article required. It will, however, serve as some sort of a guide, that we generally use from one to two ounces of the aromatic herbs and roots to every quart of fluid. A bitter infusion such as wormwood or camomile requires less of the herb. All kinds of infusions can be rendered palatable by the addition of a small quantity of honey or molasses. As a general rule, the human palate is a good criterion; for if an infusion be too strong or unpalatable for a man, it is unfit for cattle or sheep.

An infusion of either of the following articles is valuable in colic, both flatulent and spasmodic, in all classes of animals: caraway, peppermint,

spearmint, fennel seed, angelica, bergamot, snake root, anise seed, ginseng, etc.

VII. Anti-spasmodics.

By anti-spasmodics are meant those articles that assist, through their physiological action in relaxing the nervous and muscular systems.

VIII. Fomentations.

This class of remedies is usually composed of relaxants, etc., of several kinds, combined with tonics, stimulants, and anodynes. They are very useful to relieve pain, to remove rigidity, to restore tone, and to stimulate the parts to which they are applied.

Common fomentation:

No. 38. 1 Part wormwood,
1 Part tansy,
1 Part hops.

Moisten them with equal parts of boiling water and vinegar, and apply when blood warm.

Use.—For all kinds of bruises and sprains. They should be confined to the injured parts, and kept moist with the superabundant fluid. Where it is not practicable to confine a fomentation to the injured parts, as in shoulder or hip lameness, constant bathing with the decoction will answer the same purpose.

Anodyne fomentation:

No. 39. 1 Handful of hops,
1 Ounce white poppy heads,
Equal parts water and vinegar.

Simmer a few minutes.

Use.—In all painful bruises.

Relaxing fomentation:

No. 40. 2 Ounces powdered lobelia,
2 Quarts boiling water.

Simmer for a few minutes, and when sufficiently cool, bathe the parts with a soft sponge.

Use.—In all cases of stiff joints, and rigidity of the muscles.

Cedar buds, or boughs, any quantity, to which add a small quantity of red pepper and ginger, with boiling water sufficient.

Use.—Efficacious in chronic lameness and paralysis, for putrid sore throat, and when the glands are enlarged from cold and catarrh.

IX. Mucilages.

Mucilages are soft, bland substances, made by dissolving gum arabic in hot water; or by boiling marsh mallows, slippery elm, or lily roots, until their mucilaginous properties are extracted. A table-spoonful of either of the above articles, when powdered, will generally suffice for a quart of water.

Use.—In all cases of catarrh, diarrhœa, inflammation of the kidneys, womb, bladder, and intestines. They shield the mucous membranes, and defend them from the action of poisons and drastic cathartics.

X. Washes.

Washes generally contain some medical agent, and are principally used externally.

Wash for diseases of the feet:

No. 41. 4 Ounces pyroligenous acid,
8 Ounces water.

Use—This wash excels any other in point of efficacy, and removes rot and its kindred diseases sooner than any other.

Cooling wash for the eye:

No. 42. 1 Pint rain water,
20 Drops acetic seed.

Use.—In ophthalmia.

Tonic and anti-spasmodic wash:

No. 43. ½ Ounce camomile flowers,
1 Pint boiling water.

When cool, strain through fine linen.

Use.—In chronic diseases of the eye, and when a weeping remains after an acute attack.

Wash for unhealthy or ulcerated sores:

A weak solution of soda or wood ashes.

Wash for diseases of the skin:

Take one ounce of finely-pulverized charcoal, pour on it one ounce of pyroligenous acid, then add a pint of water. Bottle, and keep it well corked. It may be applied to the skin by means of a sponge. It is also an excellent remedy for ill-conditioned ulcers.

Physic for cattle:

No. 44. ½ Ounce extract of butternut (juglans cinerea),
1 Tea-spoonful cream of tartar,
2 Quarts boiling water.

Mix. When cool, administer.

Another:

No. 45. ½ Ounce extract of blackroot (leptandra virginica),
1 Ounce Rochelle salts,
½ Tea-spoonful powdered ginger.

Dissolve in two quarts of warm water.

Another:

No. 46. 1 Table-spoonful powdered mandrake,
1 Tea-spoonful cream of tartar
2 Quarts hot water.

Here are three different forms of physic for cattle, which do not debilitate the system, like aloes and salts, because they determine to the surface as well as the bowels. They may be given in all cases where purges are necessary. One-third of the above forms will suffice for sheep.

Mild physic for cattle:

No. 47. 2 Ounces syrup of buckthorn,
½ Table-spoonful sulphur,
½ Tea-spoonful ginger,
2 Quarts hot water.

Aperient:

No. 48. 1 Pint linseed oil,
Yolks of 2 eggs.

Mix.

Another:

No. 49. 1 Pint sweet oil,
½ Tea-spoonful powdered cayenne.

Mix.

A sheep will require about one-half of the above.

Stimulating tincture:

No. 50. 1 Pint boiling vinegar,
2 Ounces tincture of myrrh,
2 Teaspoonfuls powdered capsicum.

Use.—For external application in putrid sore throat.

Another:

No. 51.
4 Ounces tincture of camphor,
½ Ounce oil of cedar,
4 Ounces tincture of capsicum (hot drops).

To be rubbed around throat night and morning.

Stimulating tincture for chronic rheumatism:

No. 52.
4 Ounces tincture of capsicum,
1 Ounce oil of cedar,
1 Ounce oil of wormwood,
½ Pint vinegar,
1 Gill goose grease.

Mix. To be applied night and morning. The mixture should be kept in a well corked bottle, and shaken before being used.

XI. Poultices.

If a foreign substance enters the flesh the formation of matter is a part of the process by which nature rids the system of the enemy. A poultice relaxing and lubricating will then be indicated. If, however, the foreign body shall have entered at a point where it is impossible to confine a poultice, then the suppurative stage may be shortened by the application of relaxing fomentations, and lastly by stimulants.

Mr. Cobbett says of marsh mallow plant: It is among the most valuable that ever grew. Its leaves stewed, and applied wet, will cure, and almost instantly ease, any cut, or bruise, or wound of any sort. Poultices made of it will cure sprains; fomenting with it will remove swellings: applications made of it will cure chafes made by saddle and harness; and its operation, in all cases, is so quick that it is hardly to be believed. Those who have this weed at hand need not put themselves to the trouble and expense of sending to doctors and farriers on trifling occasions.

If the use of this weed was generally adopted the art and mystery of healing wounds, and of curing sprains, swellings, and other external maladies, would very quickly be reduced to an unprofitable trade.

Lubricating and healing poultices:

No. 53.
1 Part powdered marsh mallow roots,
1 Part marsh mallow leaves.

Moisten with boiling water, and apply.

Use.—In ragged cuts, wounds and bruises.

Stimulating poultice:

No. 54.
1 Part Indian meal,
1 Part slippery elm.

Mix them together, and add sufficient boiling water to moisten the

mass. Spread it on a cloth, and sprinkle a small quantity of powdered cayenne on its surface.

Use.—To stimulate ill-conditioned ulcers to healthy action. Where there is danger of putrescence add a small quantity of powdered charcoal.

Poultice for bruises:

Nothing makes so good a poultice for recent bruises as boiled carrots or marsh mallows.

Poultice to promote suppuration:

No. 55	A sufficient quantity of Indian meal, 1 Handful of linseed, 1 Teaspoonful of cayenne.

To be moistened with vinegar and applied at the usual temperature.

Styptics to arrest bleeding:

Witch hazel, (Winter bloom,) bark or leaves, 2 ounces.

Make a decoction with the smallest possible quantity of water, and if the bleeding is from the nose, throw it up by means of a syringe; if from the stomach, lungs, or bowels, add more water, and let the animal drink it, and give some by injection.

Styptic to arrest external bleeding:

Wet a piece of lint with tincture of muriate of iron, and bind it on the part.

There are various other styptics, such as alum water, strong tincture of nutgalls, bloodroot, common salt, fine flour, etc.

Absorbents: (for Hoven, etc.)

Absorbents are composed of materials partaking of an alkaline character, and are used for the purpose of neutralizing acid matter. The formation of an acid in the stomach arises from some derangement of the digestive organs, sometimes brought on by the improper quantity or quality of the food. It is useless, therefore, to give absorbents, with a view of neutralizing acid, unless the former are combined with tonics, or agents that are capable of restoring the stomach to a healthy state.

A mixture of chalk, salaratus, and soda is often given by farmers; yet they do not afford permanent relief. They do some good by correcting the acidity of the stomach, but the animals are often affected with diarrhea or costiveness, loss of appetite, colic, and convulsions. Attention to the diet would probably do more good than all the medicine in the world. Yet, if they do get sick, something must be done. The best forms of absorbents are the following which have been very carefully selected. They restore healthy action to the lost function, at the same time that they neutralize the gas:

Forms of absorbents:

No. 56.
1 Table-spoonful powdered charcoal,
½ Table-spoonful powdered snakeroot,
1 Tea-spoonful powdered caraways,
1 Quart hot water.

Mix. To be given at one dose for a cow; half the quantity, or indeed one-third, is sufficient for a calf, sheep or pig.

Another:

No. 57.
1 Table-spoonful powdered charcoal.

To be given in thoroughwort tea, to which may be added a very small portion of vinegar.

Another, adapted to city use:

No. 58.
1 Tea-spoonful sub-carbonate of soda,
1 Ounce tincture of gentian,
1 Pint infusion of spearmint.

Mix. Give a cow the whole at a dose, and repeat daily, for a short time, if necessary. One-half the quantity will suffice for a smaller animal.

Drink for coughs:

No. 59.
½ Ounce balm of Gilead buds,
2 Table-spoonfuls honey,
1 Wine-glassful vinegar,
1 Pint water.

Set the mixture on the fire, in an earthen vessel; let it simmer a few minutes. When cool, strain, and it is fit for use. Dose, a wine-glassful twice a day.

Another:

No. 60.
1 Ounce balsam copaiba,
1 Ounce powdered licorice,
2 Table-spoonfuls honey,
1 Quart boiling water.

Rub the copaiba, licorice and honey together in a mortar; after they are well mixed, add the water. Dose, half a pint, night and morning.

Another:

No. 61.
½ Ounce balsam of Tolu,
1 Ounce powdered marshmallow roots,
½ Gill honey,
2 Quarts boiling water.

Mix. Dose, half a pint, night and morning.

Drink for a cow after calving:

No. 62. 1 Ounce bethwort,
1 Ounce marshmallows.

First make an infusion of bethwort by simmering it in a quart of water. When cool, strain, and stir in the mallows. Dose, half a pint, every two hours.

Diuretic:

Bearberry (*uva ursi*), is a popular diuretic, and is useful when combined with marshmallows. When the urine is thick and deficient in quantity, or voided with difficulty, it may be given in the following form:

No. 63. 1 Ounce powdered bearberry,
2 Ounces powdered marshmallows,
2 Pounds Indian meal.

Mix. Dose, half a pound daily, in the cow's feed.

Eruption wash:

Borax is a valuable remedy for eruptive diseases of the tongue and mouth. Powdered and dissolved in water, it forms an astringent, antiseptic wash. The usual form is:

No. 64. ½ Ounce powdered borax,
2 Ounces honey.

Mix.

XII. Fumigations.

For foul barns and stables, take,

No. 65. 4 Ounces common salt,
1½ Ounce manganese.

Let these be well mixed, and placed in shallow earthern vessel; then pour on the mixture, gradually, sulphuric acid, four ounces. The inhalation of the gas which arises from this mixture is highly injurious; therefore, as soon as the acid is poured on, all persons should leave the building, which should immediately be shut, and not opened again for several hours. Dr. White, V.S., says, "When glanderous or infectious matter is exposed to it a short time, it is rendered perfectly harmless."

Ulceration of the mouth:

A strong infusion of goldthread (*coptis trifolia*), makes a valuable application for eruptions and ulcerations of the mouth. We use it in the following form:

No. 66. 1 Ounce goldthread,
1 Pint boiling water.

Set the mixture aside to cool; then strain, and add a table-spoonful of honey, and bathe the parts twice a day.

Astringent:

Kino is a powerful astringent, and may be used in diarrhea, dysentery, and red water, after the inflammatory symptoms have subsided. We occasionally use it in the following form for red water and chronic dysentery:

No. 67. 20 Grains powdered kino,
1 Quart thin flour gruel.

To be given at a dose, and repeated night and morning, as occasion requires.

Simple cough remedy:

The following makes an excellent cough remedy:

No. 68. 1 Ounce powdered licorice,
1 Tea-spoonful balsam of Tolu,
1 Quart boiling water.

To be given at a dose.

Antacid for hoven:

Lime water is used in diarrhœa, and when the discharge of urine is excessive. Being an antacid, it is very usefully employed when cattle are hoven or blown. It is unsafe to administer alone, as it often deranges the digestive organs; it is therefore very properly combined with tonics. The following will serve as an example:

No. 69. 2 Ounces lime water,
2 Quarts infusion of snakehead (balmony),

Dose, a quart, night and morning.

XIII. Tincture for Wounds.

Myrrh makes an excellent tincture for wounds, prepared as follows:

No. 70. 2 Ounces powdered myrrh,
1 Pint proof spirits.

Set in a close covered vessel for two weeks, then strain through a fine sieve, and bottle for use. It should be always kept on hand.

Opodeldoc:

Used for strains and bruises, after the inflammatory action has somewhat subsided.

Liquid opodeldoc:

No. 71. 6 Ounces soft soap,
1½ Pints New England rum,
½ Pint vinegar,
2 Ounces oil of lavender.

The oil of lavender should first be dissolved in an equal quantity of alcohol, and then added to the mixture.

Mucilages for catarrh, etc.:

We have given pleurisy root, (*asclepias tuberosa*), a fair trial in cattle practice, and find it to be invaluable in the treatment of catarrh, bronchitis pleurisy, pneumonia and consumption. Take:

No. 72. ½ Table-spoonful powdered pleurisy root,
1 Ounce powdered marshmallow roots.

Boiling water sufficient to make a thin mucilage. The addition of a small quantity of honey increases its diaphoretic properties.

For eruptive diseases:

The bark of sassafras root is stimulant, and possesses alterative properties. Used in connection with sulphur, for eruptive diseases, and for measles in swine, in the following proportions, it will be found valuable:

No. 73. 1 Ounce powdered sassafras,
1-2 Table-spoonful powdered sulphur.

Mix, and divide into four parts, one of which may be given night and morning, in a hot mash.

SHEEP AND SHEEP HUSBANDRY.

ORIGIN, BREEDS, CHARACTERISTICS AND MANAGEMENT.

SHEEP AND SHEEP HUSBANDRY.

CHAPTER I.

ORIGIN, PRINCIPAL BREEDS AND CHARACTERISTICS.

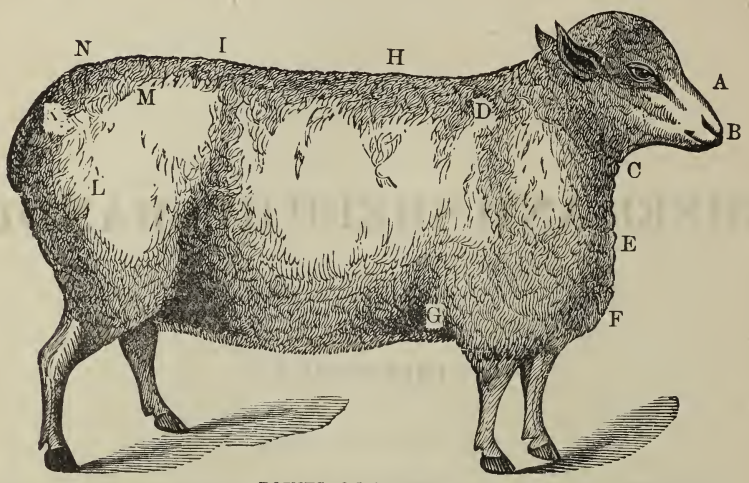
COSMOPOLITAN NATURE OF SHEEP.——LONG-WOOLED SHEEP.——I. LEICESTER.——II. BORDER LEICESTER.——III. COTSWOLD.—GOOD QUALITIES OF COTSWOLDS.—COTSWOLDS IN THE WEST.——IV. LINCOLN SHEEP.——V. NEW OXFORDSHIRE SHEEP.—— VI. MIDDLE-WOOLED SHEEP. —— VII. CHEVIOT SHEEP. —— VIII. WHITE-FACED HIGHLAND SHEEP.——IX DORSET SHEEP. —— X. SOUTHDOWNS. ——XI. HAMPSHIRE DOWNS. —— XII. SHROPSHIRE DOWNS. —— XIII. OXFORD DOWNS. —— FINE WOOLED SHEEP. —— XIV. AMERICAN MERINOS. —— THE FLEECE.——THE HEAD.——THE BODY.——THE MOST PROFITABLE SHEEP.—— DIVISIONS OF WOOL.

Cosmopolitan Nature of Sheep.

Where sheep originated is a question difficult to answer. They are the first of the animals domesticated by man, and reasonably so, since they supply the two principal wants of the barbarian, food and clothing. They are found in every inhabited country, not entirely savage, from the Arctic to the Torrid zone.

To show the great diversity in character of sheep, it is only necessary to quote the classification of Linnæus, which is: The Hornless, Horned, Black-faced, Spanish, Many-horned, African, Guinea, Broad-tailed, Fat-rumped, Bucharian, Long-tailed, Cap-bearded, and Bovant. To these may be added the Siberian sheep of Asia, found also in Corsica and

Barbary and the Cretan sheep of the Grecian Islands, Hungary, and some portions of Austria, and we have about all the principal species.

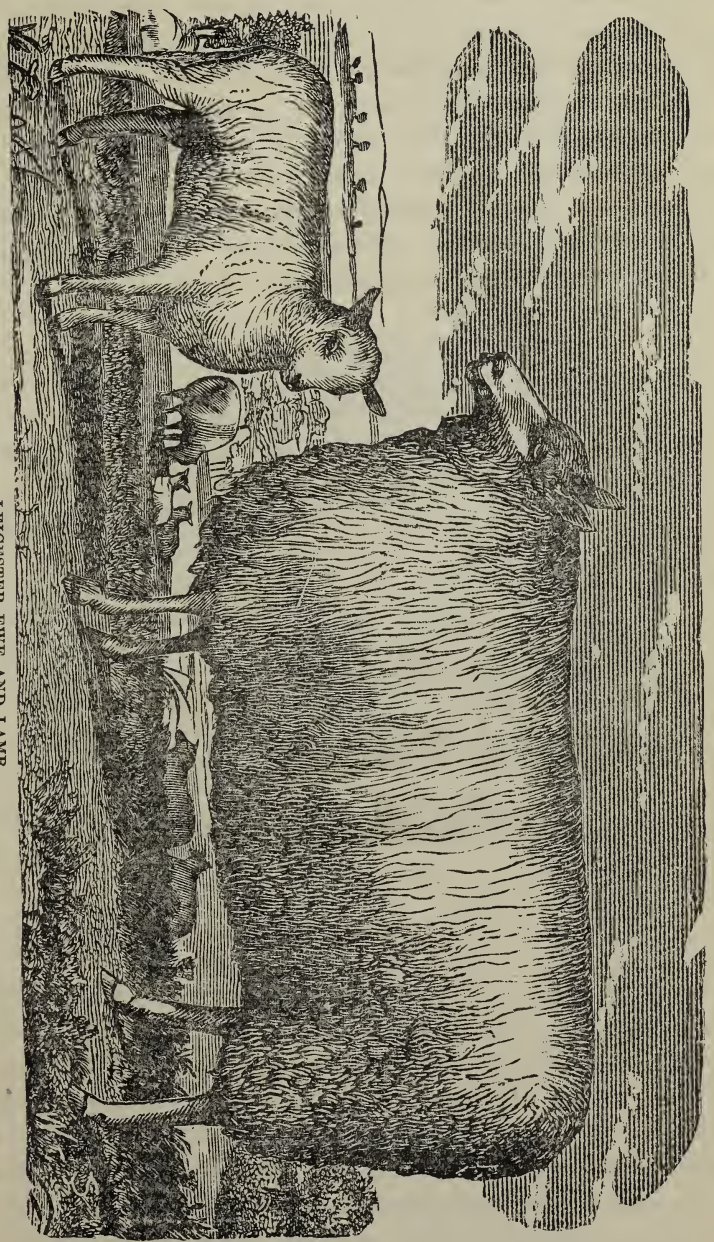


POINTS OF SHEEP.

Explanation—*A*—Face. *B*—Muzzle. *C*—Neck. *D*—Shoulder. *E*—Point of the Shoulder. *F*—Breast. *G*—Girth-place. *H*—Back. *I*—Loin. *K*—Rump. *L*—Thigh. *M*—Hip. *N*—Root of tail.

Notwithstanding the fact that sheep are among the principal sources of wealth of all peoples, it is only among enlightened nations that they have reached their highest development; and among these, Spain, France, Germany, Great Britain and her colonies, and the United States may be mentioned as those where systematic breeding have produced the most practical results. In no country has this been attained in the production of fine wool, to a more excellent degree than among what are now known as American merinoes, the result of scientific breeding of the Spanish sheep. From present appearances, it will be but a few years before we shall excel in the production of long-wooled, and mutton sheep. The United States has of course, no native sheep, if we except the *Ovis Montana*, which really is a sheep and not a goat (*Capra*) as many persons suppose. It inhabits the highest ranges of the Rocky Mountains from well north down to New Mexico. The hair, for it is not wool, although it is crimped, resembles the hair of the elk—is coarse, but soft to the touch, and slightly crimped throughout its length; about two inches long on its back, and on the sides one and a half inches. We believe they have never been bred in confinement. In passing it may be interesting to our readers to know that at the Paris Exhibition of 1865 there were exhibited the wild sheep of Barbary, *Ovis Tragelapus*, more resembling

a goat than our wild species. There were also shown there the Punjaub wild sheep, *Ovis Cycloceras*, a native of Northern India, and the European moufflon, *Ovis Musimon*, belonging to Corsica and Sardinia, but



LEICESTER EWE AND LAMB.

both bred in confinement. As illustrating something of the characteristics of the wild sheep, as well as to illustrate points the cut we give on preceding page may serve as an example.

Long-wooled Sheep.

There are but a few kinds of long-wooled sheep that have held their own in the improvement of the race for the last 100 years, sufficiently to be widely disseminated in the United States. These are the Leicester, Cotswold, Lincoln and Romney Marsh. Of these, Leicester, as improved by Bakewell and succeeding breeders, has perhaps exercised a more potent effect in crossing than any other of the long-wooled varieties. They fatten very kindly, and the best wethers will weigh at twelve to fifteen months old from 20 to 25 pounds per quarter, and at two years old from 30 to 38 pounds per quarter. The fleeces are valuable as long combing wool, and will weigh from 7 to 8 pounds each.

LEICESTER RAM.

I. Leicesters.

This breed is pure white, tolerably hardy, without horns, the head small and clean, eyes bright, neck and shoulders square and deep, the back straight, carcass full, hind-quarters tapering to the tail, legs clean, with fine bone, flesh succulent in quality, not the best, being much too fat for American palates; nevertheless, the grades make good meat with the single exception of possessing too much outside fat. Leicesters require the best of care and shelter, and of course good feeding. The ewes are not the best of mothers, and the young lambs require special attention. The wool is among the most valuable of any, being in especial

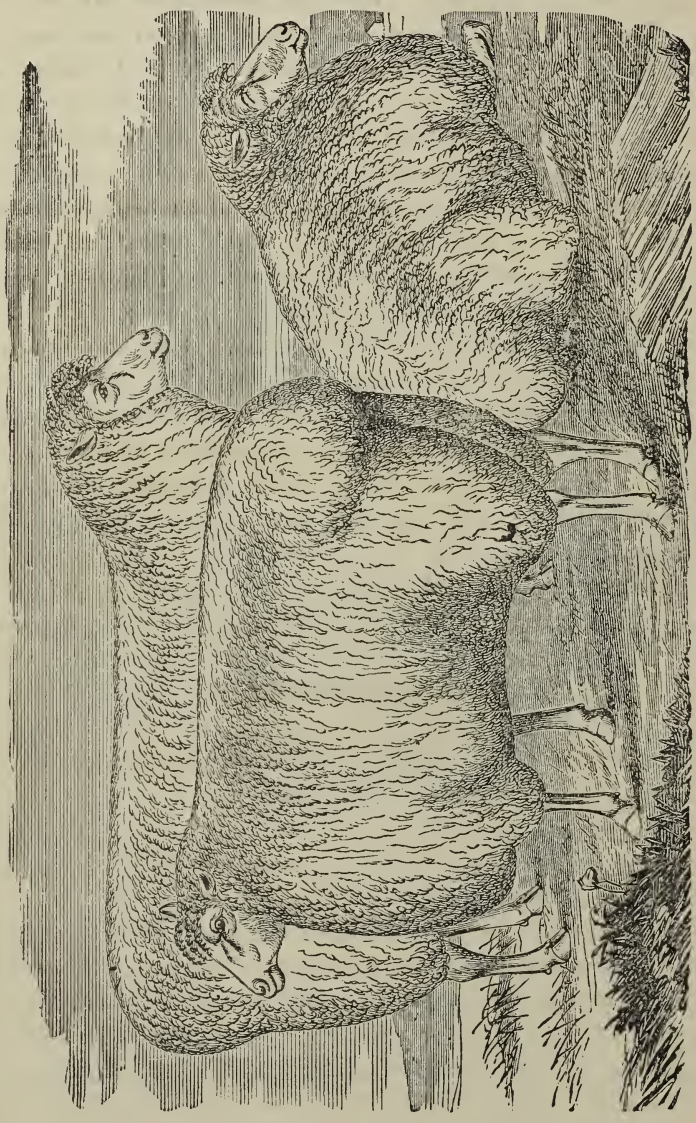
request for combing, and will average seven pounds per head in good flocks.

The Leicesters are well thought of in many parts of the West, and are increasing in popularity. The true type of the breed is as follows: The head should be hornless, long, small, tapering toward the muzzle, and projecting horizontally forward. The eyes prominent, but with a quiet expression. The ears thin, rather long, and directed backward. The neck full and broad at its base, where it proceeds from the chest, so that there is, with the slightest possible elevation, one continued horizontal line from the rump to the poll. The breast broad and round, and no uneven or angular formation where the shoulders join either the neck or the back; particularly no rising of the withers, or hollow behind the situation of these bones. The arm fleshy through its whole extent, and even down to the knee. The bones of the leg small, standing wide apart; no looseness of skin about them, and comparatively bare of wool. The chest and barrel at once deep and round, the ribs forming a considerable arch from the spine, so as in some cases, and especially when the animal is in good condition, to make the apparent width of the chest even greater than the depth. The barrel ribbed well home; no irregularity of line on the back or belly, but on the sides; the carcass very gradually diminishing in width toward the rump. The quarters long and full, and, as with the fore-legs, the muscles extending down to the hock; the thighs also wide and full. The legs of a moderate length; the skin also moderately thin, but soft and elastic, and covered with a good quantity of white wool.

II. Border Leicester.

The infusion of the blood, of the Dishley, or new Leicester as they were called, but which are now classified simply as Leicester sheep, upon the border flocks of England, gave rise to a sub-family, known as Border Leicester, and which have won a distinct position in English show yards. Their good and bad characteristics are as follows: The most marked feature in their structure, is the smallness of their heads, and of their bones generally, as contrasted with the weight of carcass. They are clean in the jaws, with a full eye, thin ears, and placid countenance. Their backs are straight, broad and flat; the ribs arched, the belly carried very light, so that they present nearly as straight a line below as above; the chest wide, the skin very mellow, and covered with a beautiful fleece of long, soft wool, which weighs, on the average, from six to seven pounds. On good soils, and under careful treatment, the sheep are usually brought to weigh from eighteen to twenty pounds a quarter at fourteen months

old, at which age they are now generally slaughtered. At this age their flesh is tender and juicy, but when carried on until they are older and heavier, fat accumulates so unduly in proportion to the lean meat as to detract from its palatableness and market value. This fat accumulation on mature animals is pretty constant in all the large and improved breeds.



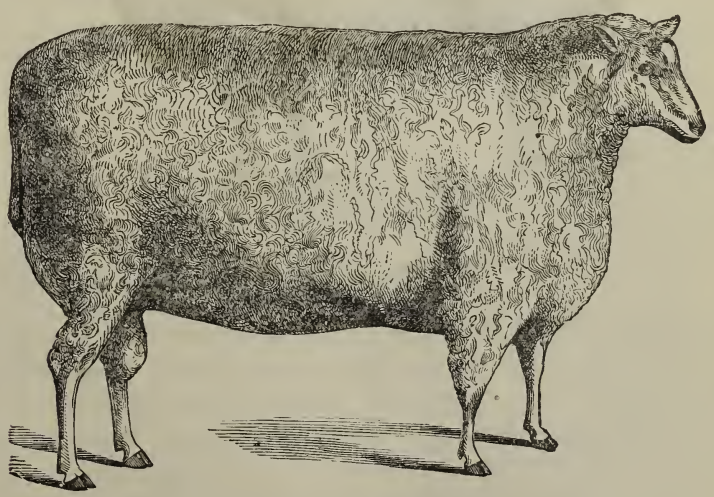
GROUP OF COTSWOLD EWES.

III. Cotswold Sheep.

The Cotswolds were imported into the United States about 1832, since which time they have been reinforced from time to time by successive

importations, and now stand in the West, in the front rank of long-wooled sheep.

This is one of the largest English breeds, though the improved race is smaller than the originals, on account of the influence of the Leicester element in its amelioration. As a breed, it is of great antiquity. It has gained in fleece and form, and comes to maturity earlier; is more prolific than the Leicester, and has greater strength of constitution; is often fattened at fourteen months, yielding fifteen to twenty pounds of mutton per quarter, and twenty to thirty, if kept till two years old. They have a large head, but well set on, a broad chest, a well-rounded barrel, and a straight back. They are often used for crossing upon other breeds, and for obtaining earlier market-lambs, both in this country and in Europe. They are more widely disseminated in this country than any other long-wooled breed, and preserve well the popularity which they have attained here. Some imported sheep of this breed have borne fleeces in this country of eighteen pounds. A great weight when we remember that the wool shrinks comparatively little in washing.



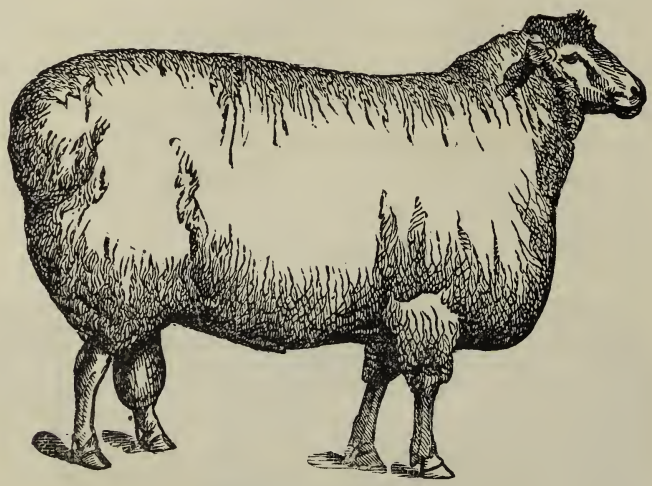
SHEARED COTSWOLD RAM.

The Cotswolds have been extensively crossed with Leicester sheep in England, by which their size has been somewhat diminished, but their carcass notably improved, and in addition, earlier maturity has been attained. The wool is strong, mellow and of good color, though rather coarse, 6 to 8 inches in length, and from 7 to 8 pounds per fleece.

Good Qualities of Cotswolds.

The superior hardihood of the improved Cotswold over the Leicester,

and their adaptation to common treatment, together with the prolific nature of the ewes, and their abundance of milk, have rendered them in many places rivals of the new Leicester, and has obtained for them of late years, more attention to their selection and general treatment, under which management still further improvement appears very probable. The quality of the mutton is superior to that of the Leicester, the tallow being less abundant, with a larger development of muscle or flesh. The ewes are prolific, and good mothers and nurses.



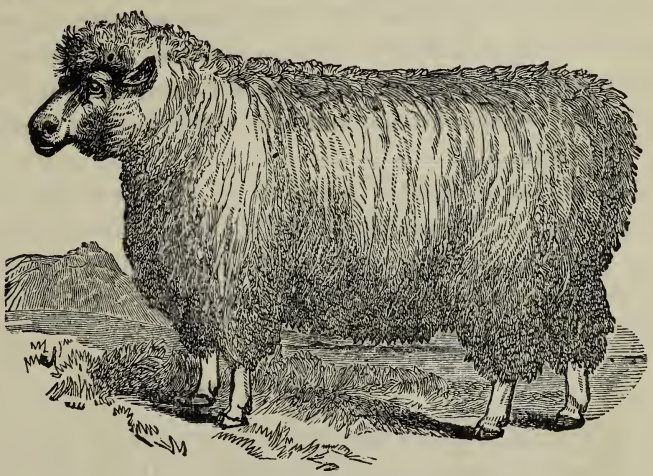
COTSWOLD SHEEP.

Cotswolds in the West.

Throughout the entire West, the Cotswold has become a most favorite breed, and this not only on account of their long, handsome fleeces, specially adapted to the purpose of combing wool, but from the kindliness with which they take to our keep and climate. For this reason we have given this breed special prominence in our illustrations. It is not our province to go into long dissertations or detailed description, it would take too much space, and be productive of no good end. The illustrations we give will furnish a better index of value and characteristics. The cut on next page will show the appearance at one year old.

In relation to the adaptability of this breed South, a prominent Clark county, Virginia, farmer says: It is far more profitable to keep the different varieties of mutton breeds, than the fine wools, or Merino breed in this portion of Virginia. I say this from my own experience, and that of many intelligent gentlemen with whom I have conversed. The Cotswold sheep, and its crosses, with the Southdown are less liable to diseases

of all kinds; they are more prolific, better nurses, and less liable to lose their lambs than the Merino. The lambs are more vigorous and hardy;



YEARLING COTSWOLD.

then add their early maturity, their fitness for market at 18 months old, and their almost double value when in market, and you have advantages

COTSWOLD EWES.

which far outweigh the additional amount of food which the mutton sheep may consume in proportion to his size. There is one thing in con-

nection with all the long-wooled and large breeds of sheep that may be appropriately mentioned here: they cannot be kept in large flocks, like the smaller and fine-wooled breeds. Merinoes are often kept in flocks of 1,000 or more in the far West. The long-wooled, the middle-wools and the mutton breeds are especially adapted for farmers, when both mutton and wool are the considerations, and are seldom herded together in fields exceeding one hundred.

Thus in all the better settled portions of the West and South, where pasture and grain are abundant, and where the nearness to market affords sale for the mutton, the long wools are increasing in numbers from year to year, and with profit to the breeders and feeders, as well as in the just appreciation of those who consume the flesh.

IV. Lincoln Sheep.

The Lincoln sheep are both larger and heavier than either the Leicester or Cotswold, and are bred to a limited extent in the United States. The first importation was made in 1835. They are hardy, large feeders, prolific, yield fleeces of from 6 to 10 pounds each, and the carcasses have been known to dress 125 pounds.

V. New Oxfordshire Sheep.

NEW OXFORDSHIRE EWE.

This breed should not be confounded with the Oxford Downs, a cross breed between Cotswold and Hampshire Downs, and which have dark faces. They are less hardy than the Cotswolds, and have not made much

progress in the United States. They are the result of a cross between the New Leicester and Cotswold, the latter blood being in excess. However they may be regarded in England, and they are regarded highly, they have not become popular in the West, as against the Cotswold. On the preceding page, we give a cut of a New Oxfordshire ewe, to close the subject of improved long wools in the United States as embracing the more prominent breeds.

VI. Middle-Wooled Sheep.

The Black-faced Scotch Highland sheep are small, active and docile when we consider that they are a purely mountain race. They stand great hardship, and work kindly in large flocks, subsisting on scanty fare when necessary. Hence they may be valuable in cold and mountain regions of the United States, for crossing on other breeds. They have open hairy fleeces, and black faces, weigh to average 65 pounds, and will shear about 3 pounds of clean wool. Their mutton is of most excellent quality, and crossed on larger breeds their fleeces will go to 6 or 8 pounds and their live weight to 128 pounds for wethers.

BLACK-FACED HIGHLAND SHEEP.

VII. Cheviot Sheep.

This is another mountain breed that has been introduced, to a small extent in the United States. Their fleeces however, are too coarse for carding wool. They are less hardy than the black-faced highlands, but

are quiet and docile, easily managed, giving fleeces averaging about 3 1-2 pounds, furnishing good mutton, weighing 12 to 18 pounds per quarter, at three years old.

VIII. White-faced Highland Sheep.

HIGHLAND SHEEP.

This is a sheep of great hardiness, furnishing good mutton, but not a wool of much value, and is introduced only as necessary to illustrate a breed adapted to sterile regions, where better breeds would not survive. Many such regions are found in our own land, especially in the Rocky Mountain sections, where the trial of this race might well be made.

IX. Dorset Sheep.

Dorsetshire has a breed peculiar to itself. Strong, active, and well able to take care of itself: heavier in every respect than the highlands, and like this breed, a strong horned race. On this account, neither of these breeds would be considered valuable, except in regions where the better fleeced breeds would not live. The cut is given like that of the highland long horned family, as affording possible value in Alpine regions. Fortunately there is but little country of this nature on this Western continent. And yet there are rigorous climates, where this breed would undoubtedly thrive and make a good return to its cultivator. The experiment may be made with much hope of success.

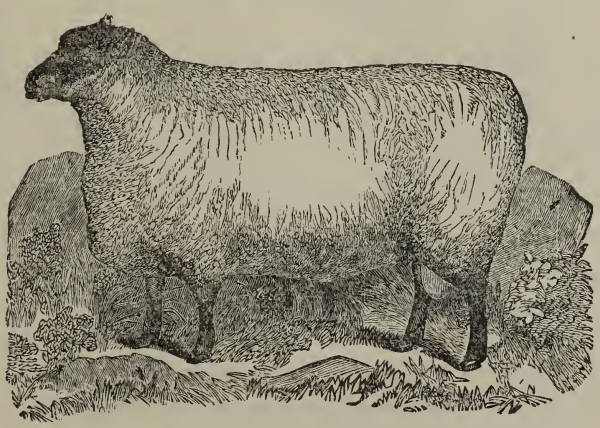
Short-wooled English Breeds.

Of the mutton breeds, the Downs undoubtedly stand at the head in

DORSET RAM.

both England and America. They are all compact, hardy, docile, horn-ess, and of early maturity in feeding; and with flesh of most excellent quality, that always commands the best price in any market.

X. Southdowns.



SOUTHDOWN RAM.

These are without doubt the most superior, taken as a whole, of any of the mutton b[illegible]ds, and have for many years been bred with the greatest

care in both England and America. Their faces and legs are dark brown, the fore quarters wide and deep, the back and loin broad, with round bodies, and square and full hind quarters.

The ewes are prolific, producing from 120 to 140 lambs, to the flock of 100 ewes. The staple of the wool is fine and curled, with spiral ends well adapted to carding, and will shear on yearling rams and wethers, from 6 to 9 pounds. In the neighborhood of large cities, where there is a demand for mutton, they are most valuable as a distinct breed, or for crossing with the common sheep of the country.

HAMPSHIRE DOWN.

XI. Hampshire Downs.

This breed had its rise in Hampshire, through an infusion of Southdown blood, followed later with Cotswold, and of course, since the Cotswold have an infusion of Leicester, they have this blood also. It has given them increased size, more wool, and at the same time they have preserved their great hardiness of constitution. For many years they have been bred pure, and so far as introduced into the United States, they have given satisfaction, especially in the South, where, before the war, they were in good repute. Those who have used them, claim that they are more hardy than Southdowns. It is also claimed that they have been crossed upon Cotswold and Leicester grades, with benefit to both, and this we do not doubt, where mutton was to be the object.

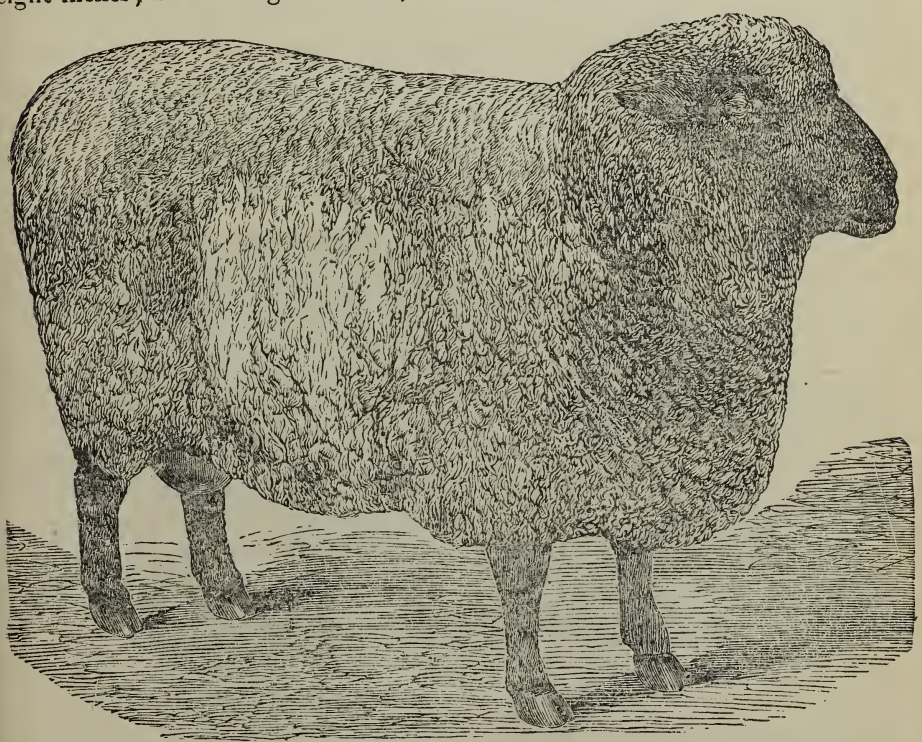
XII. Shropshire Downs.

Of late years this breed has grown into repute in the West, and in Canada. They are heavy sheep, nearly as large as the Cotswold, yield

nearly as much wool, with thick compact fleeces, are hardy and healthy, have even, compact, uniformly symmetrical bodies, with dark brown faces and limbs, and are about one third heavier than Southdowns.

XIII. Oxford Downs.

This comparatively new family, which has come into prominence in the United States within the last twenty years, was originally made by crossing the Hampshire or Southdown ewe with a Cotswold ram. They are easy-fattening sheep, producing mutton of superior quality, with fleeces of 8 to 10 pounds for ewes and 12 to 13 pounds for rams, and in length from seven to eight inches; a wool of good luster; neither hairy nor harsh.



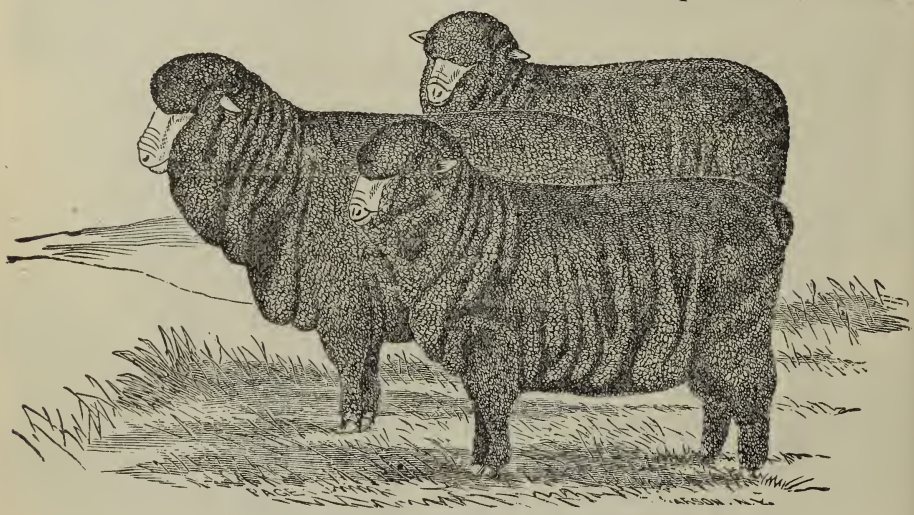
OXFORDDOWNSHIRE RAM.

In reality the only reason why these sheep should be called Downs, is, from their dark legs and faces. They really are not a short-wooled breed, in fact, as we have shown, they are a long-wooled race, and the characteristic has been carefully cultivated by breeders of this variety of sheep. In color, they are much lighter than the Southdown, their faces and legs being gray, instead of brown. The ewes are prolific, producing with good care, 150 lambs to the 100 ewes. They herd close together,

are not particular about their feed; they mature early, and upon hill pastures produce mutton of high quality.

XIV. Fine-Wooled Sheep.—American Merinos.

In treating of fine-wooled sheep, it will not be necessary to go into their history. It is enough to say that Spain and France have contributed from time to time their best specimens, which, under such management as that given by Mr. Jarvis,—selecting from five families of Spanish sheep, the Paulars predominating,—produced what was known as the mixed Leonese or Jarvis Merinos. In 1813 Mr. Atwood commenced the breeding of pure Merinos, from what was then known as the Humphrey stock. About 1844, Edwin Hammond, of Middlebury, Vermont, commenced breeding, taking for his stock selections from the Atwood family. To the judgment and skill of Mr. Atwood, and later followed by Mr. Hammond and other American breeders, we have seen produced what have been known distinctly as American Merinos; perfect in all that



GROUP OF AMERICAN MERINOS.

goes to constitute length and thickness of wool, evenness and fineness of staple, that looseness of skin which, while it lies in low, rounded, soft ridges over the body, offers no obstruction to the shears. These were the points sought, and for the last twenty years well met and sustained by the best breeders, East and West; so that we now have as thoroughly established, the descendants of the Infantado—large and of good length, and the descendants of the Paulars, a smaller breed, originally established in the United States by Mr. Silas Rich and his son, of Shoreham, Vermont. Thus making two well marked families, which it is altogether probable would be injured by the infusion of foreign blood.

The Fleece.

The fleece is the important point in Merinos; they are not mutton sheep, and their carcass is of secondary importance. Dr. Randall, nearly twenty years ago, in his work entitled "The Practical Shepherd," in writing of American Merinos, as they then were, says: "The greatest attainable combination of length and thickness of wool, of given quality, is the first to be regarded in a market where all lengths are in equal demand. And the more evenly this length and thickness extend over every covered part, unless below the knees and hocks, the higher the excellence of the animals."

It is in this point especially that the modern breeder has improved on his predecessors; and it is this, in a very considerable degree, which gives the improved American Merino its vast superiority in weight of fleece, over all other fine sheep, of the same size, in the world.

Wool of full length below the knees and hocks would hardly be desirable, on account of its liability to become filthy; but a thick shortish coat, particularly on the hind legs—making them appear as large "as a man's arm"—is regarded by many as a fine, showy point, though it does not add much to the value of the fleece.

The Head.

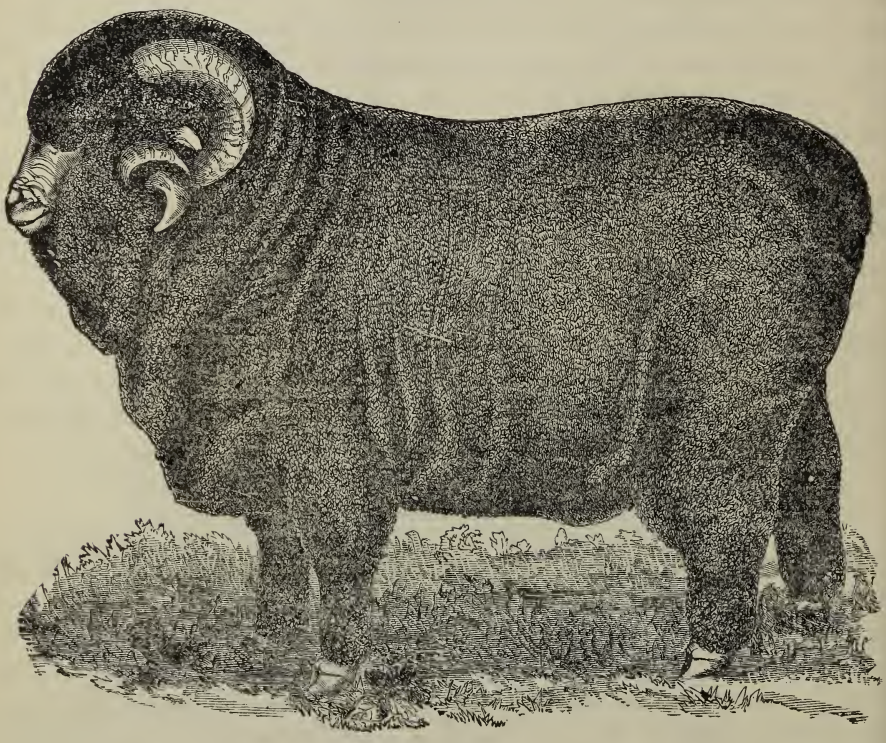
The wool should extend in an unbroken and undivided mass from the back of the neck over the top of the head and down the face for an inch or two below the eyes, and there abruptly terminate in a square or rounded shape; it should cover the lower side of the jaws nearly to the mouth, and rise on the cheeks so as to leave only the front face bare, terminating abruptly like the forehead wool. The cheek and forehead wool should meet unbroken, immediately over the eye, between it and the ear. But it must by no means *unite* under the eye—though its outside ends may touch there for a little way. The eye should have just naked space enough about it to leave the sight unimpeded, without any resort to the scissors.

The nose should be covered with short, soft, thick, perfectly white hair. Pale, tan-colored spots or "freckles" about the mouth, and the same color on the outer half of the ear are not objected to by the breeders of the Paulars—but Infantando breeders usually prefer pure white. Wool on the lower part of the face, as is often seen on the French Merinos, whether short or long, is regarded as decidedly objectionable, and any wool which obstructs the sight in any degree, is a fault.

Those who grow such fleeces now need not be ashamed to exhibit to-day in the best show rings of the country.

The Body.

The frame upon which the wool is to grow is important, for upon form and constitutional vigor depends the value of the animal. Below we give an illustration of a ram that would leave little to be desired. so far as ability to produce the best wool is concerned.



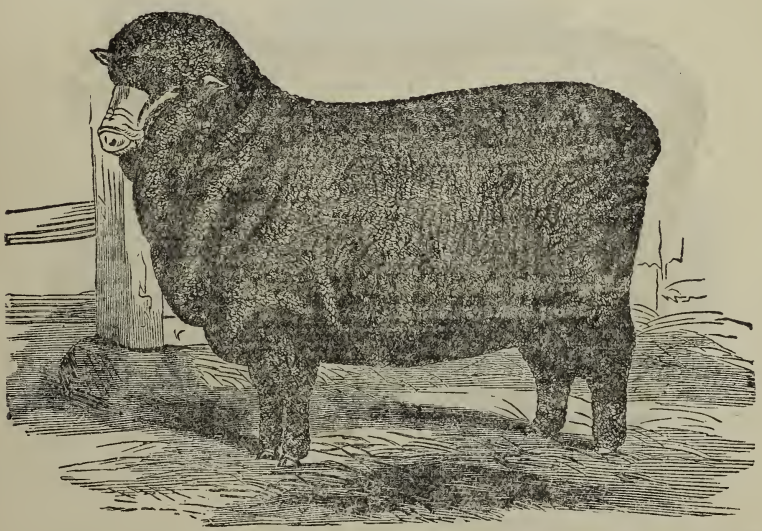
MERINO RAM.

Medium size, for the family, will hold in sheep as well as in other animals. An overgrown animal is not profitable in any breed. The body should be round, deep, of moderate length, the head and neck short and thick, back straight and broad, the legs short, straight, but well apart and strong, giving a deep full bosom and buttock. The forearm ample, and the junction of the thighs well down the hocks. The skin should be rather thin ; mellow, elastic, and loose. If it be thick and rigid, it will evidence a bad feeder, and consequently inferior wool.

The Most Profitable Sheep.

Of all the breeds of sheep ever introduced into the United States, the Merino has more than held its own in the estimation of breeders every-

where. Even in the neighborhood of our large cities, to-day, there are more grade Merinos sold for mutton, than of all the mutton breeds, distinctively. It is only near our great cities that the breeding and feeding of Cotswold, Leicester, and the Downs, could be made profitable, and this has mainly come about through the change in wearing apparel. Since the fashion came about among both ladies and gentlemen, of wearing garments of medium wool, a strong impetus has been given to the breeding of the Downs, and long wooled breeds. They are more tender and



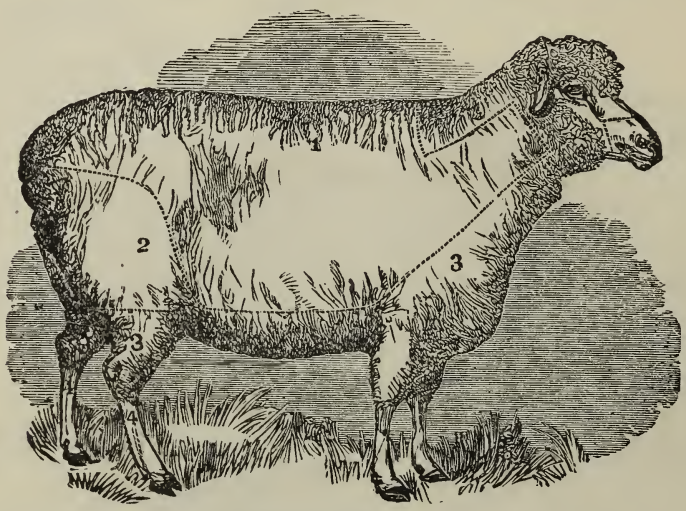
MERINO EWE.

delicate in their constitution, cannot stand extremes of cold and heat, as the Merinos; cannot shift for themselves as well, and for the reason that they cannot be kept in large flocks, are only suitable to small farms, in thickly settled districts, where good shelter and succulent food may be obtained. Thus the Merinos, and their grades and crosses will always be found the most profitable in all that great region West and Southwest, and in much of the country South, where the flocks to be profitable must number from one thousand to many thousands.

Division of Wools.

Most persons suppose that the wool of a sheep is uniform in quality. Such, however, is not the fact. As showing divisions and quality of wool, we give a cut of sheep with divisions accurately numbered, which shows points in the pure Merino and Saxon, and where the different qualities of

the wool are found. Some grades of sheep will often exhibit seven or eight qualities in the same fleece, whereas unalloyed breeds show but four qualities. The *refina*, or pick wool, (1) begins at the withers, and extends along the back, to the setting on of the tail. It reaches only a little way down on the quarters, but dipping down at the flanks, takes in all the superior part of the chest, and the middle of the side of the neck to the angle of the lower jaw. The *fina*, (2) a valuable wool, but



DIVISION OF WOOL.

not so deeply serrated, or possessing so many curves as the *refina*, occupies the belly, and the quarters and thighs, down to the stifle joint; (3) is found on the head, the throat, the lower part of the neck, and the shoulders, terminating at the elbow, fore legs, and reaching from the stifle to a little below the hock; (4) is procured from the tuft that grows on the forehead and cheeks, from the tail, and from the legs below the hock.

CHAPTER II.

BREEDING AND MANAGEMENT OF SHEEP.

WATCHFULNESS NECESSARY. —— HOW TO BREED. —— TIME FOR BREEDING. —— COUPLING. —— KEEPING THE RECORD. —— THE MANAGEMENT OF RAMS. —— TRAINING RAMS. —— PASTURING SHEEP. —— SHADE IN PASTURES. —— WATER. —— DOSING SHEEP. —— FALL PASTURAGE AND FEEDING. —— SHEEP BARNS. —— SPECIAL WINTER FOOD. —— MANAGEMENT OF LAMBS. —— DOCKING LAMBS. —— CASTRATION. —— WEANING. —— THE NURSERY.

Watchfulness Necessary.

The fecundity of sheep soon enables the breeder to gather a flock. To keep them healthy is one of the most difficult problems of the breeder, since they are generally kept in large flocks, and herding closely together as they do, if an epidemic or contagious disease gets among them, it surely goes through the whole flock unless the shepherd is ever vigilant. The lack of care and vigilance causes more than half the losses in sheep, and hence, no person should undertake sheep breeding unless he make up his mind that they are to have not only gentle treatment but daily care and watchfulness, even in the Summer.

How to Breed.

The ewe may be bred to the buck at the age of eighteen months, and the buck will be fit for service at the same age. If the object be to breed grades, it will be found to be money squandered to buy an inferior buck,

whatever his blood may be. So, if to save a few dollars, the breeder select a grade buck for breeding purposes, the money is as good as thrown away. One buck if properly kept will serve one hundred ewes, so that the cost per lamb is really light. Thus in breeding grades, pursue the same course as advised for cattle. Select a good staunch ram, of well known purity of blood, avoiding the excessively high priced animals that are simply the best breeders of pure bloods. Such an one may be bred to the common stock of the country, and to his own progeny, to the third generation. As a rule the sire will give the leading characteristics of form, size, length and density of fleece and its yolkiness, he will do this eminently in proportion to the purity of his blood. The fineness and principal characteristics will be probably controlled by the dam. Hence the importance of none but the best sires.

In crossing, the Merino may be bred upon the common ewes of the country, always with benefit to the fleece, and never at the expense of the carcass. So the Southdown will improve them in mutton and wool. The Cotswold and Leicester will give increased size, early maturity and length of staple. To breed Merinos on any of the long wooled varieties would be useless. It would detract from the valuable qualities of the wool of either, reduce the value of the mutton, the size, propensity to fatten, and prolific qualities of the long wool. In the West the sheep for money are either pure Merinos, or pure Merino rams bred unto the common sheep of the country, with the exception before stated, where farms are small and near markets where prime mutton is in demand.

Time for Breeding.

The average period of gestation in the sheep does not vary much from one hundred and fifty-two days. They usually carry a male longer than a female, the period of gestation varying a week and sometimes two weeks. Therefore the shepherd can easily calculate when to have his ewes served by knowing when he wants his lambs in the Spring. This as a rule should be at the time of new grass in the Spring. Allowing that this occurs the first of March the ewes should begin to be served about the middle of September, and the season will then probably continue to the middle of October. If lambs for slaughter be the object then the ewes should be served fully a month earlier than usual, and extra shelter, warmed with fire heat provided for lambing time. This always pays. They are the early lambs that command the high prices in the important markets of the country, and he who furnishes these must use proper means to anticipate his neighbors.

Coupling.

We do not advise the use of teasers—that is, common rams aproned to show the rutting ewes. The better way is to drive the flock up to the yard twice a day and let the ram out with the flock. Immediately he has served a ewe catch and separate her from the flock. Keep all served ewes together, and under no consideration allow but one service. If they come again in heat it will be from the fourteenth to the seventeenth day. Thus they may be again returned to the ram after the thirteenth day, and if not in heat it may be set down that they have been properly served.

Keeping the Record.

In breeding grades it is only necessary to keep a correct record of the time of coupling, to correspond to the mark on the ewe. Where pure sheep are bred it will also be necessary to keep a record of the ram used. In the first case it is necessary to know when each ewe will drop her lamb. In the case of pure bred sheep it is imperative that a full and accurate record be kept, else confusion will ensue and the breeder will have lost all that was gained before him, and no breeder of pure sheep will buy from his flock. In order to bring the ewes into season at a specific time in seasons of drouth, or scant pasture, the ewes should have extra feed for three weeks before they are required to take the ram.

The Management of Rams.

The rams should never be allowed to run with the ewes at any season of the year. They are brutal always in their teasing, and if allowed so to run they not only exhaust themselves, but the ewes drop their lambs out of season. His separate enclosure should be dry and comfortable, and kept strictly clean, and be entirely away from the sight and hearing of the ewes, except when admitted to them. His feed must be the best of hay, or fresh grass, with what oats he will eat clean daily, beginning six weeks before the season with half a pound daily, and increasing the feed gradually to two pounds daily, if he will eat so much. Some flock masters sow oats and peas together, two bushels of the former to three pecks of the latter. This when threshed and ground together and fed, gradually increasing to a quart a day, makes most excellent feed for a hard-worked ram. On such feed, with pure water within reach at all times, a ram may be expected to properly serve one hundred to one

hundred and fifty ewes, and but few of them should come back the second time.

Never keep two rams in the same enclosure. They are essentially pugnacious, and very often a valuable ram is thus sacrificed, through the mistaken economy of the owner. In the beginning of the season, a ram should not be allowed to serve more than two or at most three ewes a day. This may be gradually increased to five, and again towards the close of the season, he may be again only allowed two or three. To do justice and retain full power of fecundation, he must have a good amount of exercise. To insure this, if inclined to be inactive, he should be driven about the yard for an hour every day. As a last word of caution we add: Keep the rams away from the ewes in Winter. They often seriously injure them, and by their teasing are a cause of abortion, to say nothing of other serious injuries they may inflict. The best experience of sheep-raising confirms this rule.

Training Rams.

It is quite necessary that rams should be made to understand that any vice will be severely punished. They should be early trained to stand quietly when tied, to lead at the end of the halter. They should never be tied with a rope about the roots of the horns. It is apt to gall, and make lodgment for maggots. Fasten polled sheep by a strap about the neck, and horned breeds in the same manner while they are young. When their horns are large enough, drill a hole through the left horn, near the tip and put in a bolt with eye and two inch ring, the whole fastened with a nut. Never tease, or allow a ram to be teased. It is sure to make them vicious. Handle kindly and gently, yet with a firm hand. If inclined to be vicious, punish them severely and until they are thoroughly cowed. A vicious old ram is dangerous at all times. Sometimes they become incorrigible; when this is the case geld them at once. It is useless to waste time and patience on them.

Pasturing Sheep.

The flock should go in the pasture as early in Summer as possible, but should be housed nights, and during cold storms. They should be regularly salted, at least every other day, and when salted should be counted and examined for any ailment that may occur. The best shepherds count every day, and salt every day, graduating the doses so the sheep will eat it entirely clean; and once or twice a week, giving a larger quantity. Care in salting, as in feeding, pays abundantly. Change of pasture and the utmost cleanliness of stabling place is always helpful.

Sheep are eager for shade in warm weather. We do not believe in shading pastures with trees. It is better and cheaper to have sheds, open on all sides, and of ample size to shelter the flock. The covering may be of boughs, or anything that is cheap. We have used common factory muslin, stretched on a light frame, double pitched roof, with a two foot space at the peak, for the escape of wind: the shed twelve feet wide and running north and south. This gives free ventilation, and is the coolest shade we know.

Water.

Water is not generally considered an absolute necessity to sheep when on pasture. Where they are allowed to graze when the dew is on the grass, or the grass is succulent, they seem to get along pretty well. We like them, however, to have a chance at water once a day. In the case of ewes suckling lambs it is necessary that they have water in plenty. Absolute purity of water however is always indispensable. Sheep object to drinking foul water, and their instinct ought to satisfy any person that it is not fit for them. Many serious disorders to stock of all kinds are occasioned by drinking impure water.

Dosing Sheep.

Wet, low, or mucky pastures are not fit for sheep. It is an entirely true adage that the sheep's foot must be kept dry; nevertheless there are many sheep kept other than among firm, dry, hill pastures. Some shepherds are continually dosing with salt and alum, salt and sulphur, and various other compounds under the supposition that it tends to health. Give them what salt they need, always, and examine them often for disease. When they are well, however, let well enough alone.

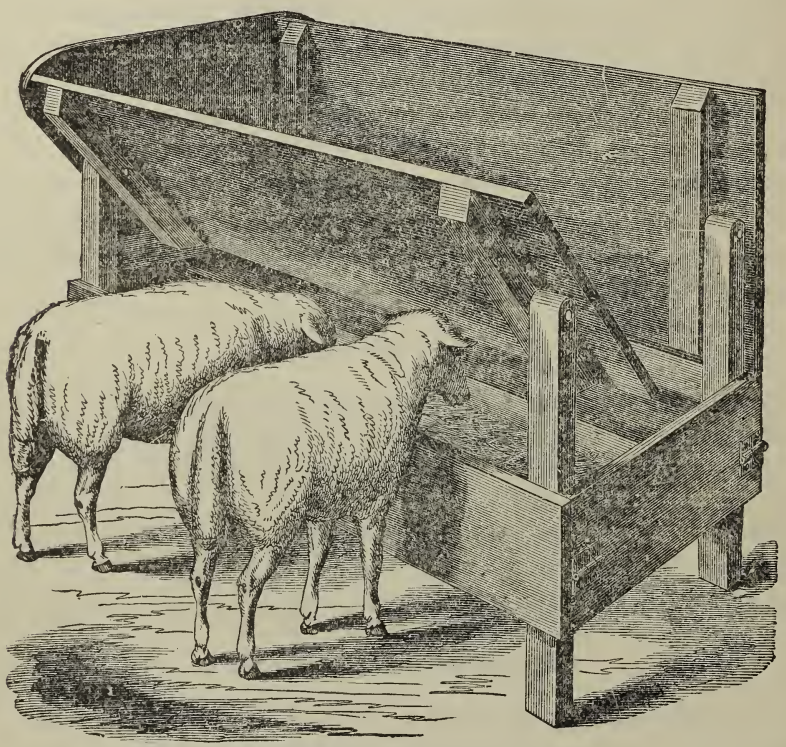
Fall Pasturage and Feeding.

In the Autumn, as the season advances, sheep should have some fodder. It is the time of year when, if allowed to fall in flesh a mischief is done that cannot be remedied. There is a peculiarity about wool that one shepherd in twenty knows nothing about. To have a uniform growth, and of equal strength, the wool must grow steadily, as the season advances. If the sheep are allowed to fall suddenly away, the growth of wool ceases. When growth again commences, the wool, instead of continuing even in texture will have what is termed a joint. This is often so weak that very slight force will break it. The microscope will reveal every period of starvation and subsequent good feeding that sheep may have experienced in the course of the year's growth of wool.

Thus the shepherd who would do well for himself must do well for his flock. He must not only feed and water well, and attend to the general health of the sheep, but he must house well.

Sheep Barns.

These need not be expensive structures, but they must protect thoroughly against wind and drifting snow, and at the same time be well ventilated. The barn is to be entirely enclosed with doors and windows, which, if made to slide, will serve for ventilation. Along the peak



CONVENIENT FEEDING TROUGH FOR SHEEP.

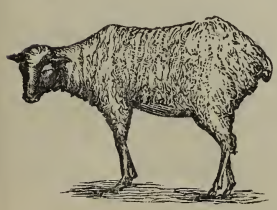
should be slatted chimneys of wood to assist ventilation. The stable should be divided into suitable pens to contain from twenty to fifty sheep each, according to the size of the flock, with doors from one to the other, racks for feeding hay, and troughs for grain, and for water also, if the sheep are to be wintered in the barn. There should also be suitable passage ways for feeding, etc. The arrangement of these racks, troughs and other conveniences, will readily suggest themselves, by referring to the plan for feeding cattle in barns. There is to be no tying up, of

course, but the same general arrangement may be followed, and when the basement of a barn is to be used, the hay, grain, etc., may be handled in the same manner as there given. There is one thing, however, indispensable: As an attachment to every sheep barn, each pen should have a yard in which the sheep may be turned out in pleasant weather, for air and exercise. They may also be fed here in pleasant weather.

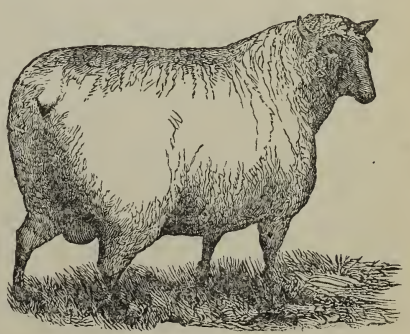
The annexed cut will show a good and substantial rack for outside feeding.

Special Winter Food.

While it is the fact that sheep may be fairly wintered on hay, it is not the most economical food in all the regions of the West and South, where corn and cereal grains are cheaply raised. Many shepherds object to corn as being too heating. We have never found any difficulty when it was fed with hay, and with a small feed of roots daily. It seems almost necessary to the health of sheep, that they have succulent food. In all the West, turnips are out of the question. Our hot Summers, and dry Autumns are not suited to this crop. Swedish turnips do better, since they may be sown late in May, or early in June and get root, so they



ALLOWED TO SHIFT FOR ITSELF.



WINTERED WITH GOOD SHELTER AND FEED.

will stand and produce good crops late in Autumn. They are also easily saved by keeping them nearly down to the freezing point in the winter pits. Sugar beets or mangel wurzel may also be raised at a cost—placed in the pits or cellar—that need not exceed two dollars a ton. Carrots and parsnips may be raised at a cost not exceeding three dollars per ton. With carrots, beets and parsnips so that each sheep may have even half a pound weight of root food once a day, they may be kept in admirable health, corn and hay being the only other food. Not only this, but we have wintered lambs in this way, and had them come out Spring after Spring, in the most admirable condition. Kept in this manner, they will

look like the young buck, shown at the right hand side of the page. Allowed to shift for themselves as best they may, they will resemble the sheep shown on the left side of the page. Which would you choose?

There is one thing that should be observed in feeding roots. Carrots may be fed at all times. In feeding other roots, feed the Swedish turnips first, and after they are gone, the beets. Beets fed early in the Winter I have not found profitable. They have an acrid quality, that after the new year seems to be lost. Parsnips may be kept in the ground until Spring, and will be found, in connection with grain, most excellent for ewes, after lambing. Until lambing time we prefer to feed carrots, and corn, with enough bran mixed to keep the bowels fairly open. Thus fed, the fleeces will be heavy and even in texture. The sheep will not shed their wool when put on to grass, and the shepherd, if he has attended to the general health of the flock, will find that sheep really pay twice; once in the fleece, and once in the carcass.

Management of Lambs.

It is absolutely necessary, when early lambs are expected, that a warm place be provided for the ewe at lambing time. The room need not be large, and may be divided into pens suitable for each ewe when there are a number to lamb at one time. Heat the room by means of a stove, and if the ewes are healthy and hearty they will take care of themselves as a rule. But the shepherd should be present in case the young lambs want assistance, and here will be found the advantage in having made the sheep perfectly familiar with and relying on the keeper, for thus there will be no fear displayed. If the lamb appear weak and disinclined to suck, handle it carefully and hold it to the dam. A young lamb is at first the weakest and most foolish animal imaginable. Once it has got on its feet and sucked it is all right.

Docking Lambs.

This should be performed as soon as the lamb is fairly strong and growing; say when a week old. Let an attendant pick up thelamb, and holding his rump pretty firm against a post of suitable height, the shepherd seizes the tail, and pressing the skin back toward the body, places a two inch chisel at the point of separation, holding it firmly enough so that it will not slip, when with a light blow of a mallet it is severed. Throw the tails of rams in one pile and those of ewes in another, and enter in the shepherd's book the sexes and numbers. It is well at the same time to place a paint mark on the rump for future recognition. A pinch of

powdered copperas on the end of the tail will stop bleeding. Occasionally a lamb will bleed severely. If so, tie a ligature tightly around the stump, to be removed in about ten hours, or a touch of red hot iron will be more effective.

Castration.

Many perform this operation immediately before docking. It has always been practiced by myself and I have never found any reason to discontinue the plan. In any event the sooner it is done the better for the lamb. I have docked and gelded at three days old, and with the best success. An attendant holds the lamb, rump down, and with the back pressed against his own body; drawing the hind legs up, the body is pressed strong enough to cause the belly to be forced between the thighs, and the scrotum is thus well exposed. Seizing the scrotum the operator cuts away one-third of it; take each testicle in turn and sliding back and off the enveloping membrane, with a quick jerk the whole cord and connecting tissues snap and come away. The object in cutting away a part of the scrotum is that it makes a better surface in shearing. This pulling away of the cord may seem cruel. It is not so; there is almost no bleeding, and the violence of the rupture deadens the pain. It is sometimes necessary to geld an old ram. The best way is to tie a waxed linen cord as tightly as possible about the bag, being careful that it is tied entirely above the testicles, and that there shall be no possibility of slipping of the knot. Thus circulation is stopped and in a few days the strangulated part will drop away; or the operation may be performed precisely as in the case of the horse. We have however never used any other means either with bulls or rams than that indicated above, and with success.

Weaning.

Spring lambs should be weaned early enough in the Fall so they may become fully accustomed to grass and to grain before Winter sets in. If a corn-field has at the last cultivating been sown with rye, it will afford nice feed for lambs in the Fall, and in the following Spring it will be found most valuable for breeding ewes. If there is stubble ground, in which green oats or wheat have started, it makes excellent pasture for lambs, since they will also pick up some grain. In any event, they should be learned to eat grain by having their salt sprinkled on grain in a trough under cover, so they may learn to eat it. So far as Winter management is concerned. the same rule will apply as to other animals. Give them

the best of the hay and a liberal quantity of grain, to keep them growing right along.

The Nursery.

In all large flocks there will always be some lambs that do not do well. These should always be separated from the others and have extra care. So in the older sheep—the flock should be graded as to age, size and sex. It is better that the wethers and the ewes be kept apart, and that in the sexes that very strong animals be not put with weak ones. If they do no other mischief, they rob the weak ones of their food, the very thing they most need. In fact, every farm should have a nursery, however small the flock, where weak ones and wethers may receive special attention and care. Sheep upon farms suited to them are very profitable, but however suitable the farm, the profits will be in direct proportion to the intelligent care and attention the animals receive.

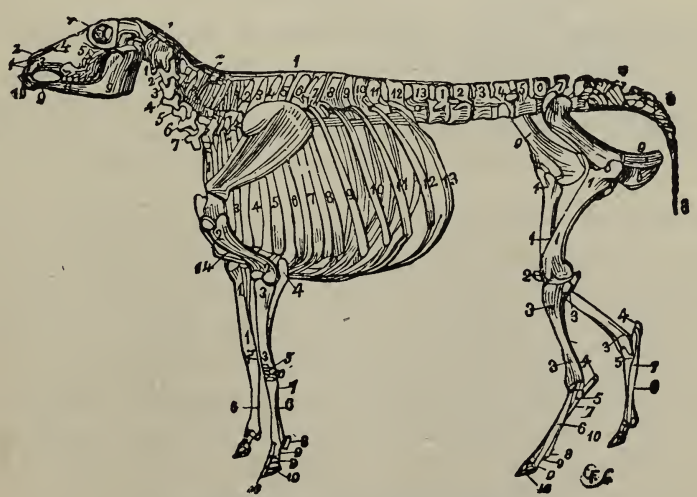
Diseases of Sheep.

CAUSES, PREVENTION AND REMEDIES.

CHAPTER I.

ANATOMY AND DISEASES OF SHEEP.

THE HEAD.——THE TRUNK.——THE FORE-LEG.——THE HIND-LEG.——IMPORTANCE OF THE HEAD TO BREEDERS. —— DISEASES OF THE HEAD AND BRAIN. —— THE TEETH.—— SWELLED HEAD. —— VEGETABLE POISONING. —— INFLAMMATION OF THE EYE.——SHEEP DISTEMPER.——HOW TO KNOW IT.——WHAT TO DO.——GRUBS IN THE HEAD. —— HOW TO SAVE THE SHEEP. ——APOPLEXY. ——PREVENTION. —— INFLAMMATION OF THE BRAIN. —— TETANUS, OR LOCK-JAW.——PALSY.——RABIES.—— HYDATIOS ON THE BRAIN. —— PARASITES OF THE BODY AND SKIN.——THE SCAB.——HOW TO KNOW IT. —— WHAT TO DO. —— DISEASES OF THE GENERATIVE AND URINARY ORGANS. —— DISEASES OF THE LIMBS AND HOOFS,——FOOT ROT. —— HOW TO CURE IT.——TOULS, AND TRAVEL-SORE FEET.——GRAVEL.——THE BIFLEX CANAL. —— MAGGOTY SHEEP. ——LUNG WORMS.——INTESTINAL WORMS.——ROTTEN LIVER.——COLIC.



SKELETON OF LEICESTER SHEEP.

The Head.

Explanation.—1—The intermaxillary bone. 2—The nasal bones. 3—The

upper jaw. 4—The union of the nasal and upper jaw bone. 5—The union of the molar and lachrymal bones. 6—The orbits of the eye. 7—The frontal bone. 9—The lower jaw. 10—The incisor teeth or nippers. 11—The molars o grinders.

The Trunk.

1, 1—The ligament of the neck, supporting the head. 1, 2, 3, 4, 5, 6, 7—The seven vertebræ, or bones of the neck. 1—13—The thirteen vertebræ, or bones of the back. 1—6—The six vertebræ of the loins. 7—The sacral bone. 8—The bones of the tail, varying in different breeds from twelve to twenty-one. 9—The haunch and pelvis. 1—8—The eight true ribs with their cartilages. 9—13—The five false ribs, or those that are not attached to the breast bone. 14—The breast bone.

The Fore-leg.

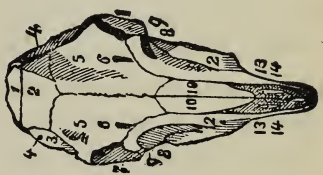
1—The scapula or shoulder-blade. 2—The humerus, bone of the arm, or lower part of the shoulder. 3—The radius, or bone of the forearm. 4—The ulna, or elbow. 5—The knee, with its different bones. 6—The metacarpal, or shank-bones; the larger bones of the leg. 7—A rudiment of the smaller metacarpal. 8—One of the sessamoid bones. 9—The two first bones of the foot; the pasterns. 10—The proper bones of the foot.

The Hind-leg

1—The thigh bone. 2—The stifle joint and its bone, the patella. 3—The tibia, or bone of the upper part of the leg. 4—The point of the hock. 5—The other bones of the hock. 6—The metatarsal bone, or bone of the hind-leg. 7—Rudiment of the small metatarsal. 8—A sessamoid bone. 9—The two first bones of the foot, the pasterns. 10—The proper bone of the foot.

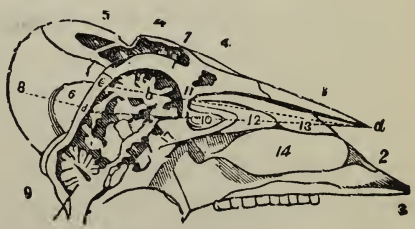
The bones of the loins bear a strong resemblance to those in the back, but instead of springing from the sides, as do the ribs, they are fixed, bony processes, several inches in length, and their peculiar duty is to afford protection to the abdomen. They are the timbers that support the roof, or covering of this part of the system. Next in position to the loin comes the sacrum, which is formed in young animals of separate bones, but at maturity is consolidated into one. At this point the passage for the spinal cord becomes very much diminished, and, at the end of the bone, terminates in several nerves, which continue their course into the tail. The bones of the latter are numerous, but not perforated. We pass now to the limbs, and find that the number of joints are the same in the horse, ox, and sheep, but in the latter animals, at the fetlock, these become divided and the four bones beneath it are thus doubled.

The bone which forms the elbow-ulna does not support much of the weight of the animal, but serves to attach the powerful muscles, so noticable in bones, with good fore-arms. The attachment of the ulna to the radius forms a lever. The carpas or knee is composed of seven distinct bones, placed in two rows. The upper row articulates with the radius; the metacarpus.



SKULL OF A POLLED SHEEP.

Explanation—1—Occipital bone, depressed out of danger. 2—The parietal bones, the suture having disappeared, and also out of danger. 3—The squamous portions of the temporal bone—the buttress of the arch of the skull. 4—The meatus auditorius, or bony opening into the ear. 5—The frontal bones. 6—The openings through which blood-vessels pass, to supply the forehead. 7—The bony orbits of the eye. 8—The zygomatic or molar bones, very much developed. 9, 10—The bones of the nose. 11—The upper jaw bone. 12—The foramen, through which the nerve and blood-vessels pass, to supply the lower part of the face. 13—The nasal processes of the intermaxillary bones. 14—The palatine processes. 15—The intermaxillary bone, supporting the cartilaginous pad, instead of containing teeth.



HEAD OF SHEEP—VERTICAL SECTION.

Explanation—1—Nasall bone. 2—Upper jaw bone. 3—Intermaxillary bone supporting the pad, supplies the place of upper front teeth. 4, 4—The frontal sinus. 5—Cavity or sinus of the horn, communicating with the frontal sinus. It is here shown by removal of a section of the base of the horn. 7—The frontal bone. 8—Vertical section of the brain. 9—Vertical section of the cerebellum. *a*—The cineritious portion of the brain. *b*—The medullary portion of the brain. 10—The ethmoid bone. 11—The cribiform or perforated plate of the ethmoid bone. 12—The lower cell of the ethmoid bone. 13—The superior turbinated bone. 14—The inferior turbinated bone. 15—The sphenoid bone.

Importance of the Head to Breeders.

The head of the sheep is one of the important points by which to estimate the quality and profitableness of the animal. The frontal bone (1) projects both forward and laterally, and gives to the sheep a peculiar

appearance as regards breadth of forehead and prominence of the eye. This design of nature is intended for the base of the horns, though in breeds known as hornless, or polled, the same formation is observable. The room from eye to eye is occasioned by the frontal bones (5, 5, of polled sheep) reaching as far below the range of vision as above it, and very materially shortening the nasal (10, 10,) bones. These reach upward to the parietal bones (2) which latter constitute an important portion of the posterior, slanting portion of the skull, just below the junction of the frontal and parietal bones; the head falls off in fullness—a backward sloping, so to speak, and the part of the frontal bone most important because covering the brain, is removed from the danger resulting from concussion of the head in fighting. The form of the brain in the sheep, is similar to that of the horse and ox, but is longer in proportion to size, and broader in the back than in the front. The brain of the sheep so closely resembles, in its conformation and structure, that of a man, though smaller in proportion, that it furnishes the medical student with a good substitute for the human subject. The membrane covering the brain is technically called the *pia mater*. The *dura mater* lines the skull, and between the latter and the former is a delicate membrane called *ternica arachmides*. The nerves, of which ten pairs are connected with the brain, and thirty with the spinal cord, supply the sense of feeling, seeing, hearing, tasting, smelling, &c., and a portion conveying the volition of the brain to all parts of the body, are termed nerves of motion.

Diseases of the Head and Brain.

In Europe, and especially in Great Britain, sheep are subject to a long category of diseases. Fortunately, in this country sheep thus far have been subject to comparatively few diseases, and especially so in the West; owing probably to the fact that, except in the Spring, and sometimes for a short period in the Autumn, the climate and the soil are dry. Mr. Spooner, the able English veterinary writer, remarks upon the rarity of inflammatory diseases in American sheep. This he attributes to the muscular and vascular structure of the sheep, comparing the indifferently kept sheep of his day with highly fed British sheep. The real cause, however, of exemption from disease lies more in the climate than anything else. Another special reason probably is that our flock masters are, as a rule, men of intelligence, who trust but little to ignorant shepherds, as is not the case in Great Britain and on the continent. We shall therefore touch lightly upon many diseases specially treated of in foreign works, and pay more particular attention to that class of diseases most prevalent with us.

The Teeth.

The sheep has eight incisors in the lower jaw, and twelve grinders—six on a side in each jaw,—making in all thirty-two teeth. At birth the lamb should have the two central incisors just pushing through. At a month old all the incisors should be up. At one year, sometimes not until fifteen months old, the two first milk incisors will be shed, and two new or permanent ones will appear. At two years old past, it will have two more permanent teeth, or four in all. At three years old past it will have six permanent incisors, and at four years old past the eight permanent teeth, or a full mouth, as it is called, will be shown. This will be an accurate test as to the age of sheep, up to four years, varied of course by care and keep; highly fed sheep developing faster than illy kept ones. At six the incisors begin to decrease in breadth, and lose their fan shape, as seen at four years old. At seven they become longer and narrower, and each year this shrinkage continues, until at last they become quite slender, the middle ones long, and at ten years they loosen and begin to drop out. In the West few sheep are kept to the age of ten years, except in the case of valuable ewes and bucks. The principal care necessary with the teeth is, if decay is suspected, to examine, and extract the decayed ones, or pierce the nerve with a hot iron.

Swelled Head.

Sheep sometimes are bitten by venomous snakes, but this seldom occurs, and when so the animal is usually beyond help before being found. The bites of insects however, sometimes give trouble. When swelling from this cause is discovered, cut the wool from around the wound, wash with warm water, dry, rub thoroughly with lard oil, and if the insect may have been a venomous one, give the following dose each hour until relief is obtained:

No. 1. ½ Scruple hartshorn,
1 Ounce rainwater.

Vegetable Poisoning.

The faces of the sheep sometimes become poisoned from feeding near noxious plants. Bathe the sore place with warm water, and then moisten with the following:

No. 2. 10 Grains acetate of lead,
1 Ounce water.
Dissolve.

This is also excellent for burns, bruises, irritable and moist ulcers, inflamed tendons, moist skin diseases, and cracked and itching surfaces, and also for sore lips.

Inflammation of the Eyes.

Simple ophthalmy sometimes occurs in sheep. If there is serious inflammation, bleed slightly from the facial vein—the vein running down obliquely from the eye, and bathe with the following:

No. 3.

3 Grains sulphate of zinc,
1 Ounce water,
15 Drops laudanum.
Mix, and bathe lightly twice a day.

Sheep Distemper.

Malignant epizootic catarrh is an epidemic accompanied by severe congestion and inflammation of the lining membrane of the nasal cavities and sometimes extending into the stomach and bowels, is as to its cause unknown, but has occasionally been very fatal, both East and West.

How to Know It.

There is depression, a slight watery discharge from the nostrils and the eyes, which are partly closed and paler than natural. There is more or less loss of appetite. The pulse is normal as to frequency, but is weaker than usual. There is no cough, and the breathing is not changed unless the bronchial tubes are affected. The symptoms increase, until the end of a week the discharge from the nose is thick and glutinous, sometimes tinged with blood; eyes half closed, the lids gummed with a yellow secretion. The respiration is difficult, emaciation and prostration great; the pulse very low, the appetite is gone, and in from ten to fifteen days the animal dies.

What to Do.

At the first symptoms, remove the sheep to a dry, well ventilated place, where they may be kept comfortably warm. Give them concentrated and nourishing food and stimulants. If the bowels are costive, give them, say:

No. 4.

8 Grains corrosive sublimate,
1 Oz. rhubarb.
2 Oz. ginger,
2 Oz. gentian.

Simmer the last three in a quart of water for ten or fifteen minutes; strain, and add the first. Give two table-spoonfuls twice a day. In any case, avoid all strong purging or bleeding. An equable warmth, good feeding, nourishing drinks, and good nursing, is what will save, when possible, if taken early. If not well nursed the patient will be sure to die.

Grubs in the Head.

In July and August, if sheep are seen standing crowded together with the heads close to the ground, occasionally stamping violently, or striking with their fore feet, be sure the sheep gad-fly *Œstrus Ovis*, is attempting to deposit her eggs in the nostrils of the sheep. This fly is somewhat like the ox gad-fly, but smaller. The egg deposited, the maggot soon hatches, ascends the sinuses of the nose, causing much irritation. Then it grows during Winter, and in the Spring descends and falls on the ground, burrows therein, assumes the form of a chrysalis, to be again transformed into a perfect fly.

How to Save the Sheep.

Prevent the flies from laying their eggs. Plow a portion of the field into furrows of loose soil; keep the sheep's noses smeared with tar, by tarring once a day through the season of the fly. I have caught them in a light bag net, such as boys use in catching insects. A reward of five cents for every fly caught would well repay the sheep owner.

The maggots affix themselves by their strong hooks, and are not easily dislodged. Violent sneezing will sometimes dislodge them. Thus Scotch snuff may be blown up the nostrils. The infested sheep may be driven in a close place, and horn shavings or leather burned to irritate the membrane of the nostrils. A better way, when carefully done, is to secure the sheep, hold the head up, and pour into each nostril a teaspoonful of equal parts of sweet oil and turpentine, well shaken together. Be careful, however, that the sheep is not strangled by the mixture entering the lungs. The grubs are sometimes extracted by the surgeon. It is a nice operation, and as a rule will not pay its cost

Apoplexy.

This is a disease seldom seen in the United States, and confined to sheep of a plethoric habit, and is generally fatal if not taken early. The sheep leaps suddenly in the air, falls and dies in a few moments. The remedy is early and copious bleeding from the neck (jugular) vein, until

the sheep shows signs of weakness. A pint of blood is sometimes taken from full-bodied, large sheep and less for smaller ones.

Prevention.

This is better than cure. If a sheep be dull, and apparently unconscious of what is going on; if the membranes of the nose are deep red or violet, the nostrils and pupils of the eye dilated, the pulse hard, and the breathing stertorous, bleed immediately, and afterwards give two ounces of salt, to be followed by an ounce every six hours until a copious evacuation is produced.

Inflammation of the Brain.

This is a secondary effect of the causes which produce apoplexy. The animal is dull and inactive. The eyes are red and protruding, and at length the animal rushes about in the wildest delirium. The same remedy is prescribed as for apoplexy.

Lock-jaw.

This is produced from a variety of causes, among the more common, being inflammation of the membranes from improper gelding, injuring the hoofs, horns, etc. The animal is unable to walk, or only so with difficulty; the jaws are set, and death ensues in a short time. Warmth, quiet, and bleeding from the jugular vein, is recommended. We should omit the bleeding and give one-half to three-quarters of an ounce of castor oil, according to the age of the sheep, the disease being confined mostly to lambs, and sheep after gelding. Follow the dose of castor oil, in half an hour, with ten grains of opium, and at the end of an hour, give another ten grains of opium if a decided sedative effect is not produced. Epilepsy is a kindred disease, in fact tetanus is considered to be an aggravated state of epilepsy. The remedial means will be the same.

Palsy.

This is the opposite of epilepsy. The sheep is unable to move its limbs. It is supposed to be produced by cold and improper treatment. It is rare in this country. Take the lamb to a warm place, give it warm gruel, with a little ginger mixed in it. If a purgative is indicated give:

No. 5 2 Oz. epsom salts,
¼ Drachm ginger.

Mix in half pint of ale or water; to be followed by two drachms of laudanum in an hour.

Rabies.

Sheep are apt to be bitten by rabid dogs. The only preventive is to kill all strange or suspiciously acting dogs. The remedy is to kill the sheep as soon as attacked. The perils attending treatment, and the hopelessness of the case, dictate this course.

Hydatids on the Brain.

This is a disease of rare occurrence in America, probably from the fact that range is greater and dogs fewer to the square mile. The disease once fixed, nothing, practically, can be done, at least except a thorough veterinary surgeon be called, since it involves a delicate surgical operation. The bladder worm or hydatid is a form of the tape worm of the dog, in an earlier stage of existance. The mature tape worm lives in the bowels of the dog, its eggs are voided with the excrement, and in close pasturage the sheep take the eggs while grazing; hatching, they make their way to the brain, where they grow, and must remain until eaten by some other animal. Thus the dog eats the sheep's head, acquires the tape worm, and the insect again goes its round of life. Allow no sheep's heads to be eaten without thorough cooking, kill all strange dogs, and give your shepherd dogs a good vermifuge occasionally.

One of the plans adopted to get rid of the hydatid when it can be located is to pierce the cyst with the needle of a strong hypodermic syringe, and inject into it half a tea-spoonful of the following:

No. 6.

1 Grain iodine,
5 Grains iodide of potash,
1 Ounce water.
Mix.

Parasites of the Body and Skin.

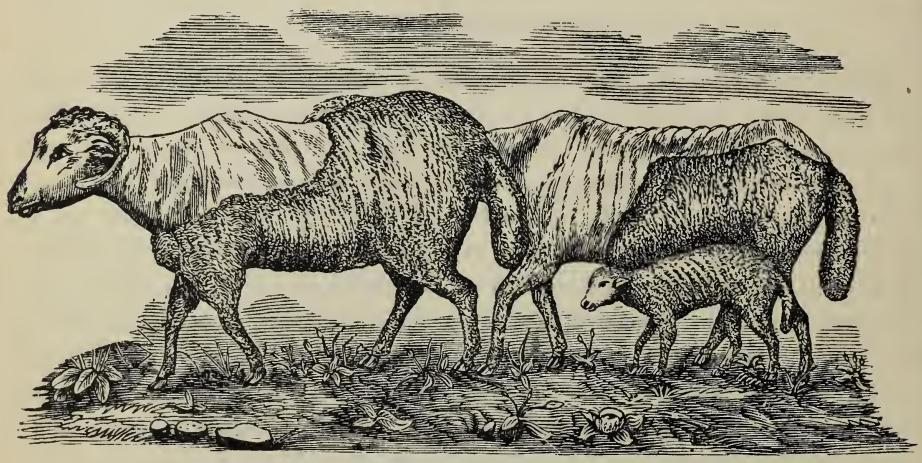
Sheep are infested with lice, three different forms of parasites which produce scab, also with ticks, intestinal worms, parasites of the liver, lungs, etc.

The Scab.

This is produced by a minute, almost microscopic insect, which burrows under the cuticle, producing intense irritation, the escape of serum, and which drying, brings off with it wool and all, and, spreading with great rapidity, soon infests the whole flock. The tenacity of life of these insects is so great that a scabby pasture has been said to spread the contagion after three years. The prevention of infection should be imperative with every flock master.

How to Know It.

The sheep is restless and constantly rubbing itself against posts and other objects it can get near. It bites itself with its teeth, and scratches itself with its hoofs. Soon the fleece becomes ragged and begins to fall out, and the animal appears wretched and unsightly, and at length dies.



A BAD CASE OF SCAB.

What to Do.

The remedies are both liquid and oily. A good dip, and one regarded in England as most effective, is the following:

No. 7.

3 Pounds arsenic,
3 Pounds pearl ash,
3 Pounds sulphur,
3 Pounds soft soap.

Mix in ten gallons of boiling water, stir, but avoid the fumes, and add ninety gallons of cold water. Prepare a tank that will easily allow a sheep to be dipped, having a slanted, slatted drain at the side, tight bottom underneath to allow the drip to run back. Dip the sheep, back down, being careful not to allow the head to enter the poisonous mixture, letting the animal remain one minute. Lift on to the slats and rub and squeeze the wool, until pretty well drained, and place in a yard until dry. When dry, go over the flock again, as to the heads, with the following:

No. 8.

1 Pound mercurial ointment,
6 Pounds lard,
1 Pound rosin,
¼ Pint oil of turpentine.

Mix the mercurial ointment witn the lard by heating gently and stirring. Dissolve the resin in the turpentine and rub all together when the lard is cold. Part the wool on the head between the ears, on the forehead, along the neck and under the jaws, and rub in the ointment.

In the United States, tobacco is often used in the place of arsenic; if used, substitute ten pounds of strong tobacco leaves for the arsenic in the formula as given above.

A formula in great repute among Australian shepherds, is the following:

No. 9. 1 Pound tobacco leaves,
1 Pound sulphur,
5 Gallons water.
Boil the tobacco in the water, then add the sulphur.

The sheep is dipped in this solution while quite hot, and retained in it four or five minutes, its head being from time to time thrust under so as not to enter the eyes, nose, or mouth, and the wool pressed and dried as before stated.

Diseases of the Generative and Urinary Organs.

Use the remedies prescribed for cattle, noting the doses as given for sheep in the list of medicines for animals.

Diseases of the Limbs and Hoofs—Foot Rot.

This is an infectious disease often aggravated by grit and dirt increasing the inflammation. The indications of rot are described minutely by Dr. Randall:

The first symptom is the disappearance of the naturally, smooth, dry, pale condition of the skin at the top of the cleft, over the heels. It becomes somewhat red, warm and moist, and slightly rough or chafed. Next, the moisture increases to a discharge, and an ulcer is formed which extends down to the upper portion of the inner wall of the hoof. These walls are then attacked, become disorganized, and the disease penetrates between the fleshy sole and the bottom of the hoof. The hoof is thickened at the heel by an unnatural deposition of horn. The crack between it and the fleshy sole pours out an offensive and purulent matter. Soon all parts of the foot are penetrated by the burrowing ulceration, the horny sole is disorganized, and the fleshy sole becomes a black and swollen mass of corruption, shapeless, spongy, and often filled with maggots. The fore-feet are usually first attacked; lameness is early noticed and soon

becomes complete; the appetite is lost, and the animal dies from exhaustion. The offensive odor of the true foot rot is characteristic, and once made familiar will serve as a certain guide in recognizing the disease. The disease may present itself in a malignant and rapid form, or in a mild one. The first attack on a flock is generally of the severe character. When it is kept under the first year, its appearance the next Summer will be mild; and the third season still milder.

How to Cure Rot.

Every part of the diseased structure must be cut away, cleaning the knife from time to time. This thoroughly accomplished, prepare a tank, which is to be filled to a depth of four inches, with a strong, saturated solution of sulphate of copper, blue vitriol; let each sheep stand in this, heated as hot as they can bear, for ten or more minutes, keeping the whole hot by occasionally plashing a piece of heated iron in it, or adding a quantity of the solution boiling hot. It is also well to cover the hoof with chloride of lime, and fill the cleft of the hoof with a piece of tow long enough so the ends can be twisted into a cord to be fastened around the fetlock. This makes a good bandage. The hoofs should be examined daily for sometime and the chloride renewed if necessary. Keep the sheep in a dry, well-littered yard, or on a dry, short pasture, and feed well. If the case is bad, the following tonic given internally will be necessary:

No. 10.

2 Drachms common salt,
½ Drachm sulphate of iron,
½ Drachm nitrate of potash.
Mix as a powder and give daily.

Fouls and Travel-sore.

These may be cured, the first by washing the cleft of the hoof with warm water and applying a strong solution of blue vitriol, and the latter by touching the thin places in the hoofs with a feather dipped in oil of vitriol, and smearing over with tar. Or better, prepare the following lotion and use occasionally:

No. 11.

1 Part solution of chloride of antimony,
1 Part compound tincture of myrrh.

Gravel.

Sheep often become graveled. If lame in the least examine them, and cut the horn of the hoof to expose the gravel; extract it and cover the wound with tar.

The Biflex Canal.

The issue as it is called (biflex canal) in the front and upper part of the hoof, sometimes becomes irritated and swollen. Do not follow the advice of ignorant persons and "cut out the worm." If any thing is embedded therein, extract it. If simply swollen and inflamed, and perhaps ulcerated, lance it in two or three places slightly and dress with compound tincture of myrrh.

Maggoty Sheep.

Often in hot weather, from one cause or another, flies will lay their eggs, either in a wound, or, if the sheep is dirty, in the accumulated dung about the thighs. The prevention is cleanliness. Keep the sheep well tagged, that is shear the wool from under the sides of the tail, and diagonally thence some ways down the thighs. If maggots exist they must be taken out, and the wounds touched with

No. 12. 1 Part creosote,
4 Parts alcohol.

And afterwards bathed daily, until relieved, with tincture of myrrh.

Other Diseases.—Lung-Worms.

This disease is caused by the presence of worms, the *strongulus filaria*, which sometimes make their way into the lungs, but are usually found in the windpipe and bronchial tubes and bowels of sheep. If there is dysentery, with fetid stools, examine the evacuations and the mucus of the mouth and throat for indications of the worms. If there is a husky cough and quickened breathing; if the sheep rubs its nose on the ground; if it lose its appetite and flesh prepare the following:

No. 13. 6 Oz. sulphate of magnesia,
4 Oz. nitrate of potash.

Pour on these three pints boiling water, and when the solution is milk warm add:

No. 14. 4 Oz. oil of turpentine,
½ Oz. bole armeniac.

Mix well and give two or three tablespoonfuls every other day.

When the worms are supposed to prevail, the following may be made into twelve doses, one to be given once in two weeks, as a preventive:

No. 15. 2 Oz. oil of turpentine,
2 Oz. powdered gentian,
2 Oz. laudanum.
Dissolve in a quart of lime water.

This is enough for twelve sheep.

Intestinal Worms.

The presence of intestinal worms and other parasite affections may be often found if shepherds would take the trouble to dissect a dead sheep. When found in one, the presumption is good that many are affected, for these parasites seldom appear in individual cases only. As a preventive, when feared, plenty of salt should be allowed, and the following prepared to be given once in two weeks.

No. 16.
2 Lbs. common salt,
1 Lb. sulphate of magnesia,
½ Lb. sulphate of iron,
½ Lb. powdered gentian,
Mix:

This is sufficient for 80 to 100 sheep to be given in ground feed.

Dr. Tellor says: Ordinary wood soot, as it can be collected from the chimney is a very efficient vermifuge, often used, both in children and the lower animals. It may be mixed with salt, or sprinkled on the fodder. Another cheap and useful vermifuge, in the form of a drink, is—

No. 17.
1 Lb. quick lime,
5 Oz. sulphate of iron.

Mix with five gallons of water, and give a pint twice a week.

As a vermifuge in round and thread-worms, the shepherd may use—

No. 18.
2 Oz. linseed oil,
¼ Oz. oil of turpentine.

For a drench.

For tape worm, the following:—

No. 19.
½ to 1 Drachm, powdered areca nut,
10 to 20 Drops, oil of small fern.

Give in molasses and water, and follow next day with a purge.

The Rot, or Liver-Fluke.

This is a disease caused by flat worms, (*Fasciola hepatica*,) in the liver. If by rubbing the skin of a sheep backward and forward at the small of the back as taken between the thumb and fingers, it is soft and flabby and there is a crackling feeling in the fingers, as if there were water underneath: if there is weakness and tenderness about the loins; if the belly swells, and the eye becomes jaundiced; if there is a diarrhea, a weak heart and general stupor, and no veterinarian is near, isolate the animals in a high dry pasture, give abundant and nutritious food and prepare the following:

No. 20. ½ Lb. sulphate of magnesia,
3 Drachms oil of turpentine.

Mix for a drench, and give every two days, one-third of the quantity at a dose.

The following is an English remedy and said to be very effective:

No. 21. 1½ Drachms yellow resin,
1 Oz. oil of turpentine,
10 Grains calomel,
30 Drops tincture of iodine.

For three doses, one to be given every morning for three days, in gruel.

Colic.

The best preventive is to keep sheep off of pastures liable to inundation, since the worm passes one stage of its existance in shell fish and water insects, which are carried into such pastures by floods, and the sheep get the germs with the grass.

Lush pasture to hungry sheep, ergot in fodder, musty or blighted grain, will produce colic or hoven in sheep as in cattle. The presence of gas is sometimes so strong as to rupture the walls of the rumen or third stomach. If the case is not serious, press and knead the stomach, and give the following:

No. 22. 2 Drachms sulphate of potash,
1 Oz. common salt,
1 Oz. sweet oil.
Mix in a wine glass full of water.

If the inflation is great, get a rubber tube, of half inch calibre, fasten a pledget of wool over the end to prevent clogging, oil thoroughly and introduce gently down the throat to the stomach. If this means fail and the swelling continues, remove the wool from the most prominent part and plunge a trocar into the stomach. If a trocar is not to be had use a common sharp pointed pen knife, and keep the orifice open by inserting a goose quill.

SWINE.

HISTORY, BREEDS, CHARACTERISTICS AND MANAGEMENT.

SWINE.

History, Breeds and Characteristics.

CHAPTER I.

HISTORY AND BREEDS.

ORIGIN OF THE HOG.——TEETH OF THE HOG.——IMPORTANCE OF SWINE TO MAN.—I. IMPROVED BREEDS OF SWINE.—ENGLISH BREEDS.—II. THE BERKSHIRES.——ESTABLISHING THE IMPROVED BERKSHIRE.——STANDARD CHARACTERISTICS OF BERKSHIRES.——III. NEAPOLITAN HOGS.——IV. ESSEX BREED.——V. YORKSHIRE HOG.—VI. SUFFOLKS.—VII. LANCASHIRE HOGS.—VIII. LANCASHIRE MIDDLE-BREED.—IX. LARGE LANCASHIRE.—AMERICAN BREEDS.——X. POLAND CHINA.—XI. CHESTER WHITES.—XII. JERSEY REDS.—CHESHIRES.—XIII. CHARACTERISTICS.——RECAPITULATION OF BREEDS.

Origin of the Hog.

The great antiquity of the hog, *sus scrofa* of Linnæus, is fixed from the fact that remains of several fossil species have been found in the tertiary and diluvial deposits of Europe, and allied species in India. The wild hogs, from which the domestic breeds have taken their rise, are native of Europe, Asia and Africa, and are found wherever the climate is mild enough to afford sustenance in Winter, and in a domestic state wherever civilization has been extended. The fact of the origin of the domestic hog is well established from the fact that it will interbreed and continue entirely fertile, the succeeding fertility of the offspring, to the remotest generations, proving the homogeneity of the species.

In America, in Australia and in the Polynesian group, hogs were unknown until introduced. In England the wild species has long been extinct. In France they are nearly so, but in some parts of Germany, Denmark, Italy, Greece, and in Asia Minor they are still met with. In America swine are said to have been introduced into Hispaniola by Columbus in 1493; into Florida by De Soto in 1538; into Nova Scotia and Newfoundland in 1553, into Canada in 1608, and into Virginia in 1609. So great was the fecundity of swine in Virginian forests, that in eighteen years after their introduction the inhabitants of Jamestown had to palisade the town to keep them out.

Teeth of the Hog.

The domestic hog has, when full grown, forty-four permanent teeth, twenty-eight of which are preceded by temporary, or milk teeth. The teeth are classified as follows: Twelve incisors or front teeth, six in the upper and six in the lower jaw. The incisors in each jaw are divided equally, three on each side of the median line, of which the foremost are called the nippers; the next outside of these, intermediary incisors, and the remainder, outside of these are called corner incisors. Next in order are the four tusks, one on each upper and one in each under jaw on each side. The true grinders or molars are six in number, not including the so-called "wolf teeth," four in number, but which are now classed with the molars, making really seven on a side in each jaw. Each of the three hindmost molars in the four rows are permanent teeth, or not preceded by milk teeth. The three next in front of these appear soon after birth, one after another, and are called milk teeth (or premolars) and in the course of time are shed one after another, in the order in which they appeared, to give place for the permanent molars. These six molars are counted from the hindmost one forward. The seventh molar tooth, or the fourth premolar, appears later, in the space between the third premolar and the tusk. This small, apparently supernumerary tooth is sometimes called a wolf's tooth, and was once considered as an independent tooth, not belonging to the molars. It is now classed with the molars, to which it undoubtedly belongs. It is a permanent tooth, and is sometimes very small and imperfect, which is accounted for by the near proximity of the large and strong tusk.

The teeth of the hog may therefore be represented by the following formula: Incisors, six upper six lower; canines, one upper one lower on each side; wolf teeth, so-called, now determined to be molars, one upper one lower on each side; molars, six upper six lower on each side; in all 44 teeth.

To Tell the Age of Swine.

Furstenburg, a well known German authority, has given the following summary for determining the age of swine:

The animal is born with eight teeth—four corner incisors and four tusks.

On the eighth or tenth day appears the second or third temporary molar.

At four weeks old the four nippers appear—two in the upper and two in the lower jaw.

At the fifth or sixth week the foremost temporary molars appear in the upper and lower jaw.

At the age of three months the intermediary incisors have appeared above the gums.

At the sixth month the so-called wolf's teeth will have appeared; and at the same age appear the third permanent molars.

At the ninth month the following teeth will have appeared: namely the permanent corner incisors, the permanent tusks, and also the second permanent molars.

At the twelfth month the permanent nippers will be in view.

With the twelfth and thirteenth months the three temporary molars will have been shed, and their permanent substitutes, which, at fifteen months of age, will have fully appeared, are now just cutting through the gums.

With the eighteenth month the permanent intermediary incisors and the hindmost permanent molar will have made their appearance; and, with the twenty-first month, they will be fully developed.

Importance of Swine to Man.

Next to cattle, swine are the most important to man as an article of food. In the adaptability of pork for successfully standing long voyages, either barreled or smoked, in the value of lard for various culinary, lubricating and burning purposes, its place could not easily be supplied now.

As showing the importance of swine breeding in the United States, the following table is given, extending from 1871 to 1878 inclusive:

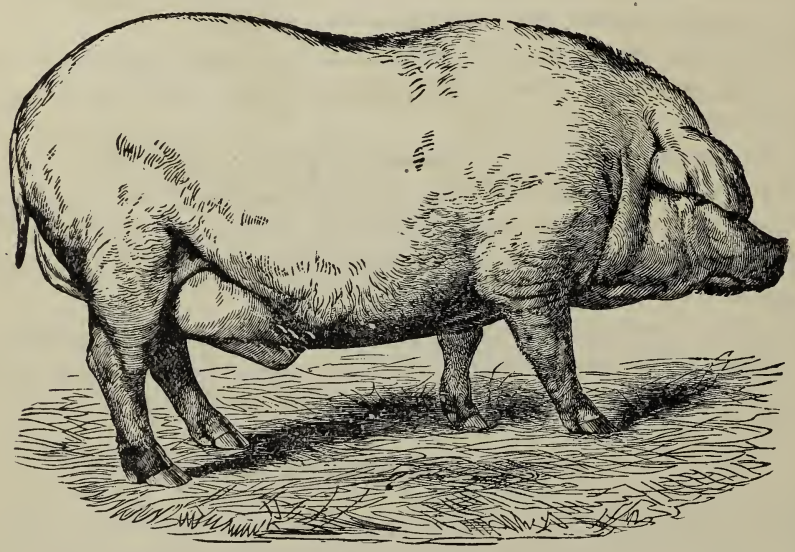
1871—29,457,500,	1875—28,062,200,
1872—31,796,300,	1876—25,726,800,
1873—32,682,050,	1877—28,077,100,
1874—39,860,900,	1878—32,362,500.

In the year 1878 the three greatest hog producing States were Iowa,

Ohio and Illinois; of these Iowa contained 2,244,800; Ohio, 2,341,411; and Illinois, 3,355,500 hogs. In 1878 there were packed in Chicago alone over 5,000,000 swine, or one-sixth the whole number raised in the United States.

I. Improved Breeds of Swine.

To the India hog, the Chinese and the Neapolitan is due more than to any other, the improvement in English breeds, and from those introduced into the United States are due our own American breeds, that have now become unexcelled in any quarter of the globe for the purpose for which they are intended; early maturity, aptitude to fatten at any age, and ultimate weight of the mature animal. Of these the Chinese hog has given great fattening propensities.

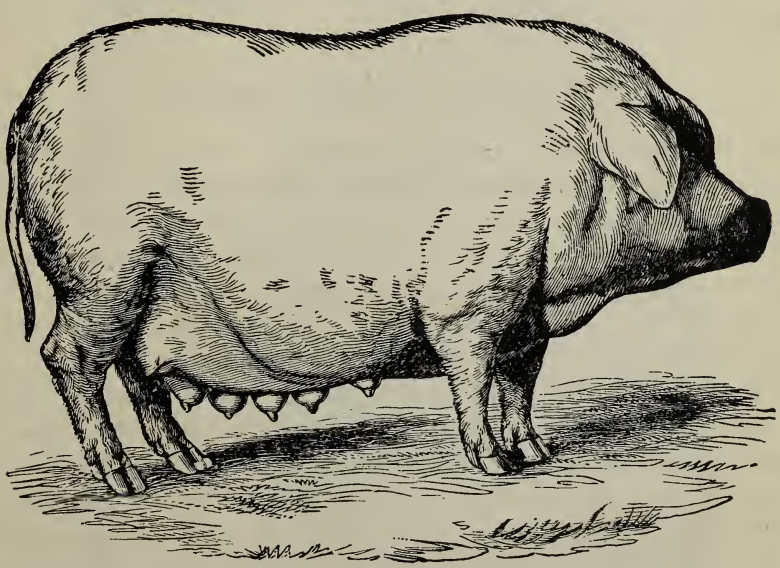


OLD CHINA BOAR.

The illustration we give will show first, the appearance of the boar as known years ago, and on the next page the sow. This breed has had a very marked influence as one of the bases of the Poland-China breed of the present day, and is said to have been introduced in the West, in Ohio, in 1816.

Civilization in China antedates that of all other nations. Hence it is quite probable that the systematic breeding of swine among that people antedates that of other ancient nations. This again is proved by the prepotency of the blood of this hog. It has formed the basis of im-

provement in all our modern breeds, both in England and America. In England its prepotency has been strongly felt in all the breeds and has transferred the long-legged, coarse-boned, elephant-eared, and big-headed swine of Old England into the deep-bodied, broad-necked, short-nosed, compact, and early-maturing Berkshire, Essex, Suffolk, Small Yorkshire and other representative breeds, which have been further improved by the



CHINA SOW.

infusion of Neapolitan blood, reducing the hair, hide and bone until now but little more is to be desired. And in our own country it has given us the Poland-China, Chester whites, improved Cheshires and New Jersey reds,'— breeds which may compete most favorably with any others in the United States.

English Breeds—The Berkshires.

This now magnificent breed has been bred in Berkshire, England and in adjacent countries from a very early day. Their origin is thus reported: The family of hogs in Berkshire, England, which was the foundation of the present improved breed, was of a sandy or buff color, about equally spotted with black; was of a large size, a slow feeder, and did not fully mature till two and a half or three years old. But as such it was very highly esteemed for the proportion of lean to fat in its meat, and for the superior weight of its hams and shoulders, thus rendering the whole carcass peculiarly fitted for smoking, for which purpose it was said to

excel all other English breeds. The improvement is reported to have commenced sometime during the last century, through the importation and crossing on the females of a Siamese boar. This breed was, in color from a jet black to a dark slate, or rich plum color; of medium size, quick to mature; very fine in all points, with short, small legs and head; thin jowls; a dished face; slender, erect ears; broad, deep, compact body, well ribbed up; extra heavy hams and shoulders; a slender tail; thin skin, and firm, elastic flesh.

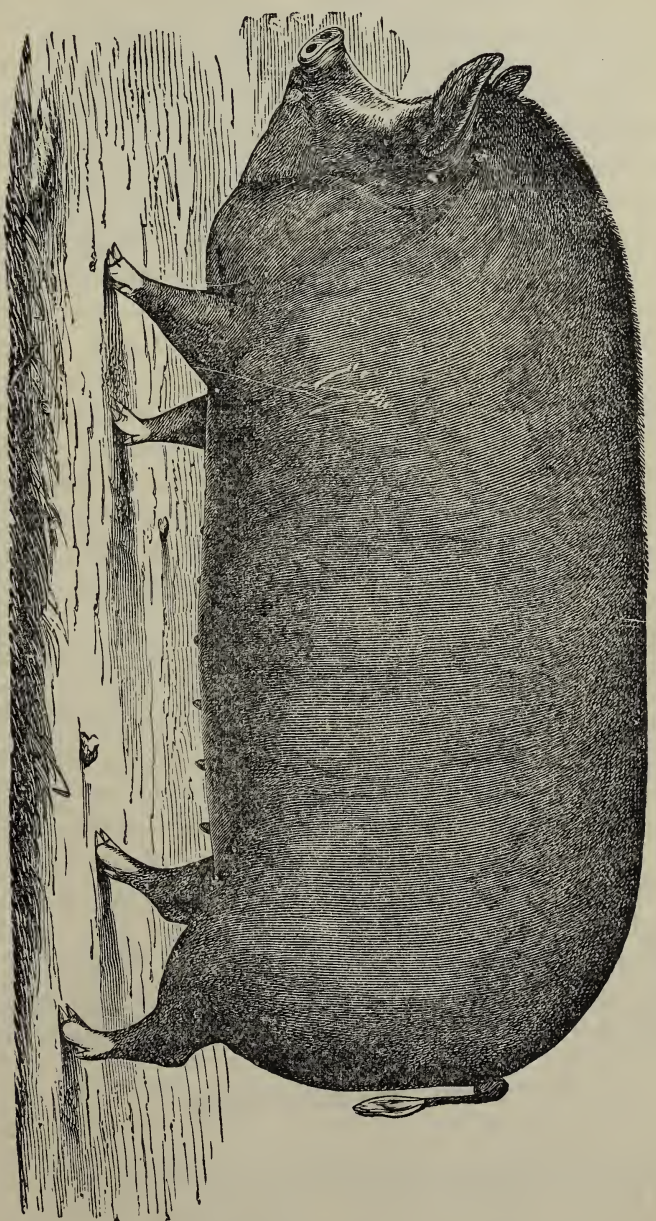
Establishing the Improved Berkshire.

After using the Siamese boar in Berkshire to the old style of females as long as it was considered best, he was discarded, and the cross pigs then bred together. In 1838 as we and others bred this swine in Illinois, they were in color a deep, rich plum, with a slight flecking on the body, of white, or buff, or a mixture of the two; having a small blaze in the face; two to four white feet, and more or less white hair on the tail. The plum color was preferred to the black or slate, because it carried rather higher style and higher points with it, and a superior quality of flesh, softer hair, and finer skin. Since that time the Berkshires have been much improved in style and compactness, but probably not in excellent meat points. In lean meat in the bacon pieces, and in superior hams and shoulders, they excel all other breeds. It must be acknowledged, however, they were always somewhat harder feeders than the best of the very fat breeds.

Standard Characteristics of Berkshires.

The following may be accepted as a standard of characteristics and marks: Color black, white on feet, face, tip of tail, and occasional splash of white on the arm. While a small spot of white on some other part of the body does not argue an impurity of blood, yet it is to be discouraged, to the end that uniformity of color may be attained by breeders. White upon the ear, or a bronze or copper spot on some part of the body argues no impurity, but rather a reappearing of original colors, by reversion. Markings of white other than those named above, are suspicious, and a pig so marked should be rejected. Face short, fine and well dished; broad between the eyes; ears generally almost erect, sometimes inclined forward with advancing age, always small, thin, soft and showing veins; jowl full; neck short and thick; shoulder short from neck but moderately deep from back down; back broad and straight, or very little arched; ribs long and well sprung, giving rotundity

of body; short ribs of good length, giving breadth and levelness of loin; hips good length from joint of hips to rump; hams thick, round and deep, holding their thickness well back and down to the hocks; tail fine and small, set on high up; legs short and fine, but straight and very



BERKSHIRE SOW.

strong, with hoofs erect and legs set wide apart; size medium; length medium, since extremes are to be avoided; bone fine and compact; offal very light; hair fine and soft; no bristles; skin pliable.

III. Neapolitan Hogs.

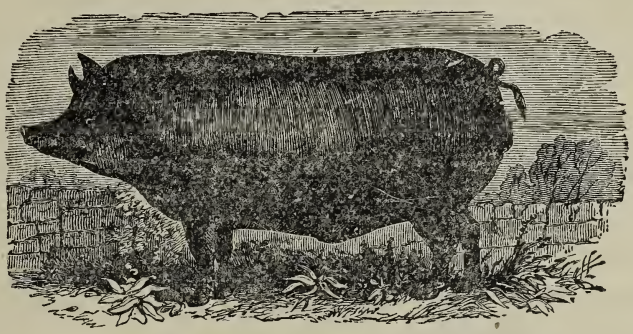
Sidney, in writing of the Neapolitan pig, says: "The Neapolitan pig is black, or rather brown, without bristles, consequently delicate when first introduced into our northern climate. The flesh is of fine grain, and the fat is said to be free from the rankness of the coarser tribes." Referring to the supposed descent of the breed from the wild boar of Europe, he adds: "It is more probable that the Neapolitans are the descendants of the dark Eastern swine imported by early Italian voyagers and cultivated to perfection by the favorable climate and welcome food." Neapolitan pigs have been for many years frequently taken to England. Martin credits the great improvement in English swine, which has taken place within thirty years, chiefly to the agency of the Neapolitan and Chinese breeds, conjointly, or to either alone. He names especially the Essex, Hampshire, Berkshire and Yorkshire, and to these Youatt adds the Wiltshire, and enforces Martin's statement as to the Berkshire and Essex. Their earliest introduction into the United States was in 1840–41. They seem, however, not to have been well bred specimens. About 1850 a Mr. Chamberlain of Red Hook, New York, made an importation direct from Sorrento. They were all of a dark slate color, and their pigs were like themselves and none with white, ash or drab color on them. The following may be accepted as a perfect description of this breed and their points:

Head small; forehead bony and flat; face slightly dishing; snout rather long and very slender; ears small, thin, standing forward nearly horizontally, and quite lively; jowls very full; neck short, broad and heavy above; trunk long, cylindrical and well ribbed back; back flat, and ribs arching, even in low flesh; belly horizontal on the lower line; hind-quarters higher than the fore, but not very much so; legs very fine, the bones and joints being smaller than those of any other breed; hams and shoulders well developed and meaty; tail fine, curled, flat at the extremity, and fringed with hair on each side; general color slaty, or bluish plum color, with a cast of coppery red; skin soft and fine, nearly free from hair, which, when found upon the sides of the head and behind the fore-legs, is black and soft, and rather long; flesh firm and elastic to the touch

IV. The Essex Breed.

It is well known that the Neapolitan was a prime integer in the improvement of the Essex breed of swine. In comparing specimens of the two breeds one can see plainly the cross of a broad, deep, gross feeder with an animal of great delicacy and refinement—the cross proving, when es

established, to combine those qualities which are of greatest value in the parent breeds, and being capable of imparting them to crosses with breeds less finely organized.



ESSEX BOAR.

The Essex originated in the south of England and are entirely black. They are small to medium in size, and are extensively used in England as crosses on the large coarse swine, with a view to improving their fattening qualities. The best specimens may be known by being black in color; face short and dishing; ears small and soft, standing erect while young, coming down somewhat with age; carcass long, broad, straight and deep; hams heavy, and well let down; bone fine, and carcass when fattened, mainly composed of lard; hair generally rather thin; fattening qualities superior. The black color of the Essex, as is the case with all the improved black swine, is only confined to the epidermis or scarf skin; when dressed the skin is beautifully white and clean. The cut we have given of the Essex boar, will very well represent the Neapolitan with the exception that the Essex is a comparatively well haired breed.

V. The Yorkshire Hog.

The Yorkshires are among the best of the pure bred swine of England, and have stamped their impress upon nearly all the modern white breeds. Their good qualities are: They are of a size, shape and flesh that are desirable for the family or the packer's use. They are hardy and vigorous in constitution, have a good coat of hair, protecting the skin so well either in extreme cold or heat that it rarely chills or blisters. They are very prolific and good mothers; the young do not vary in color, and so little in shape that their form when matured may be determined in advance by an inspection of the sire and dam.

The Yorkshire, medium or middle breed, says Mr. Sydney, is a modern

invention of Yorkshire pig breeders, and perhaps the most useful and popular of the white breeds, as it unites, in a striking degree, the good qualities of the large and small. It has been produced by a cross of the large and the small York and Cumberland, which is larger than the small York Like the large whites, they often have a few pale blue spots on the skin, the hair on these spots being white. All white breeds have these spots more or less, and they often increase in number as the animal grows older.

It was not until 1851 that the merits of this breed were fully recognized, when at a meeting of the Keighley Agricultural Society, the judges having called the attention of the stewards to the fact that several superior sows, which were evidently closely allied to the small breed, had been exhibited in the large breed class, the aspiring intruders were, by official authority, withdrawn.

The middle Yorkshire breed are about the same size as the Berkshire breed, but have smaller heads, and are much lighter in the bone. They are better feeders than the small whites, but not so good as the large whites; in fact, they occupy a position in every respect between these two breeds.

The Cumberland, a middle breed Yorkshire, are not distributed throughout the West, but when thoroughbred specimens have been introduced they are held in great esteem, as well for an animal for exhibition purposes as for family use. They are especial favorites with packers who buy their stock on foot for the reason that they yield larger proportionate net weights than any other hogs which grow large enough for their use. They are small in bone but large in flesh, of the very best quality, evenly and proportionately distributed over the whole frame.

VI. The Suffolks.

The Suffolks owe nearly all their good qualities probably to the infusion of Yorkshire blood.

Mr. Sidney says that Yorkshire stands in the first rank as a pig feeding county, possessing the largest white breeds in England, as well as excellent medium and small breeds, all white, the latter of which, transplanted into the south has figured and won prizes under the name of divers noblemen and gentlemen, and under the name of more than one county. The Yorkshires are closely allied to the Cumberland breeds, and have been so much intermixed, that, with the exception of the very largest breeds it is difficult to determine precisely where the Cumberland begins and the Yorkshire ends. The Manchester boar, the improved Suffolk, the improved Middlesex, the Caleshill and the Prince Alberts or Windsors were

all formed on Yorkshire-Cumberland stock, and some of them are nearly pure Yorkshires, transplanted and re-christened Speaking of the pigs kept in the dairy district of Cheshire, he says that white pigs have not found favor with the dairymen of Cheshire, and the white ones most used are the Manchester boars, another name for the Yorkshire-Cumberland breed. All the writers who have followed him down to the latest work published on the subject, occupy space in describing various county pigs which have long ceased to possess, if they ever did possess any merit worthy of the attention of the breeder. Thus the Norfolk, the Suffolk, the Bedford and the Cheshire have each separate notice, of which the Suffolk alone is worthy of cultivation, and the Suffolk is only another name for a small Yorkshire pig.

We submit also a brief description of the Suffolk's "points:" Head small, very short; cheeks prominent and full; face dished; snout small and very short; jowl fine; ears small, thin, upright, soft and silky; neck very short and thick, the head appearing almost as if set on front of shoulders; no arching of crest; crest wide and deep; elbows standing out; brisket wide, but not deep; shoulders and crop-shoulders thick, rather upright, rounding outward from top to elbows; crops wide and full. Sides and flanks---ribs well arched out from back, good length between shoulder and ham; flank well filled out and coming well down at ham. Back broad, level and straight from crest to tail, not falling off or down at tail; hams wide and full, well rounded out; twist very wide and full all the way down. Legs and feet—legs small and very short, standing wide apart, in sows just keeping the belly from the ground; bone fine; feet small, hoofs rather spreading; tail small, long and tapering. Skin, hair and color—skin thin, of a pinkish shade, free from color; hair fine and silky, not too thick; color of hair pale yellowish white, perfectly free from any spots or other color. Size small to medium.

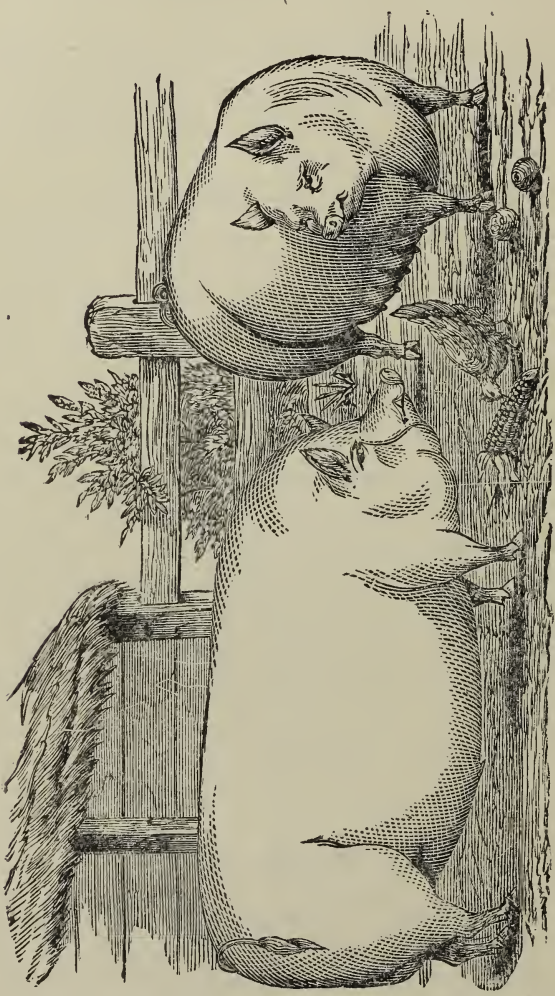
VII. Lancashire Hogs.

There are three breeds in Lancashire, England, that have attained celebrity, namely, the short-face, the middle breed, and the large Lancashire white. On next page we give an illustration of the short-faced breed.

This breed of swine may be known by the following characteristics: The shortness of the face from the eyes to the end of the snout; prick ears; small bones; a good coat of white hair; cubic in form, with broad back and broad hams, well let down. The skin, as well as the hair, is white, although an occasional one may be found with a few dark blue spots in the skin, but never dark or black hairs. The small breed hogs

must have small bones; a short face; silky hair; fine, small, upright ears; a comparatively square form; must have good square hams, the most valuable part of the hog; must carry the meat near the ground; flat on the back, straight and cubic in form.

VIII. Lancashire Middle Breed.



SHORT-FACED LANCASHIRE HOGS.

This breed is one which partakes of the quality of the small breed and the size of the large breed. Middle bred hogs are got by crossing large bred sows with small bred boars, but all attempts to attain the same results by reversing the operation, and putting large bred boars to small bred sows, have proved failures. The largest of the middle bred sows are used

to improve the large breed. A middle bred hog must have a short face, and all other good qualities of the small breed, except that they may be longer in proportion to their width; must have thicker legs and longer bones to carry the greater size; should be well haired (fattening to full form often causes the hair to fall off, which must be allowed for.) As good a *short* rule as can be adopted to judge them by is as follows: The best middle bred hog should have the greatest possible share of all the qualities of the small breed, with the length, and, in a measure, the larger bones of the large breed.

IX. Large Lancashire.

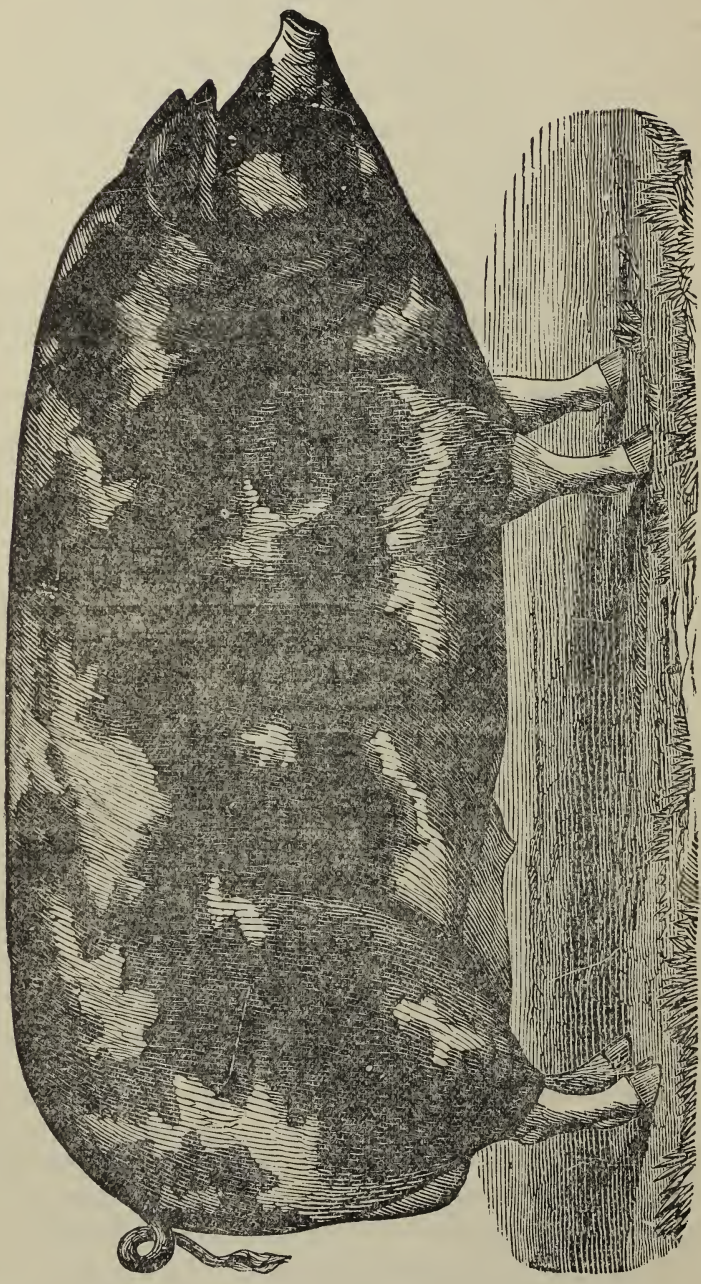
This variety of swine have large bones, of great height and length, and are the largest breed of swine known. They are a true breed, their qualities have descended from generation to generation — the quality being improved by judicious selection. They must be of large size; great length; flat back, with large square hams, and when fattened, must carry their width of back along over the hams; must have deep and tolerably straight sides; large feet and leg bones; hair short; may have a long face, but it had better be short, as they fatten better; may have a large, drooping ear, but other quality and size being equal, an upright, smaller ear is preferred. They usually have a long, thick, strong tail. They must be of great weight when fattened.

American Breeds.

Sagacious breeders in the United States nearly fifty years ago, saw the necessity of establishing breeds of swine that should be eminently adapted to the especial requirements where Indian corn and grass must necessarily form the principal food of the swine from weaning time until slaughtered. Then and until the last twenty years, mere fat was the important product in swine, as it was in a degree in cattle. Since that time the universal introduction of petroleum has reduced the value of lard and tallow to a minimum. Improvements in the art of preserving food fresh has made barreled pork, a less necessary product even for long voyages, and the attention of the breeders was again turned to the production of as much lean meat in their hogs as possible. This naturally led to a reduction in the weight of the hog, or at least, if the animal should be capable of reaching a heavy weight at maturity, it must also possess the important quality of fattening at any age. This has now been fairly met in the best English and American breeds. If we were asked to choose the breeds from each which would produce the most lean meat for the carcass, we should say the Berkshire of English breeds, and the Poland of American breeds.

X. Poland China.

Over the history and characteristics of this breed there has been much



POLAND-CHINA BOAR.

controversy. Individual breeders have sought to take undue credit to themselves in the establishment of the breed, and have sought undue

prominence by attaching their own names to the swine of their breeding. The facts are, the name Poland-China is a misnomer so far as Poland is concerned, for there is not a particle of evidence that a distinctly Polish breed of hogs ever gave an infusion of blood. The nearest evidence—and this traditionary—to this effect, is, that long ago a sow was bought of a Polander, which, proving an excellent breeder, it went by the name of the Polander sow. The breed is now largely indebted to the Chinas and Berkshires for their good qualities. Although they certainly have an infusion of so-called Irish grazier in them. Why this breed should have been called grazier, one can only surmise. They certainly were anything but grass eaters, but the name made them popular for a time in the then far West where grain at that time was scarce. The facts are, the Chinese hogs, imported into Ohio in 1816, and bred upon the best native stock of the country are the basis of the breed. In 1835 the Berkshire was introduced, and in 1839 or 1840 the Irish grazier. These were extensively used by the best breeders, on the best descendants of the China crosses. Since 1842, there is good evidence to show that new blood has not been introduced, but by careful selection, and judicious breeding, in Ohio and the West, or, by occasional judicious infusion of Berkshire blood, they now leave little to be desired, as a heavy, well meated breed, that will fatten kindly at any age.

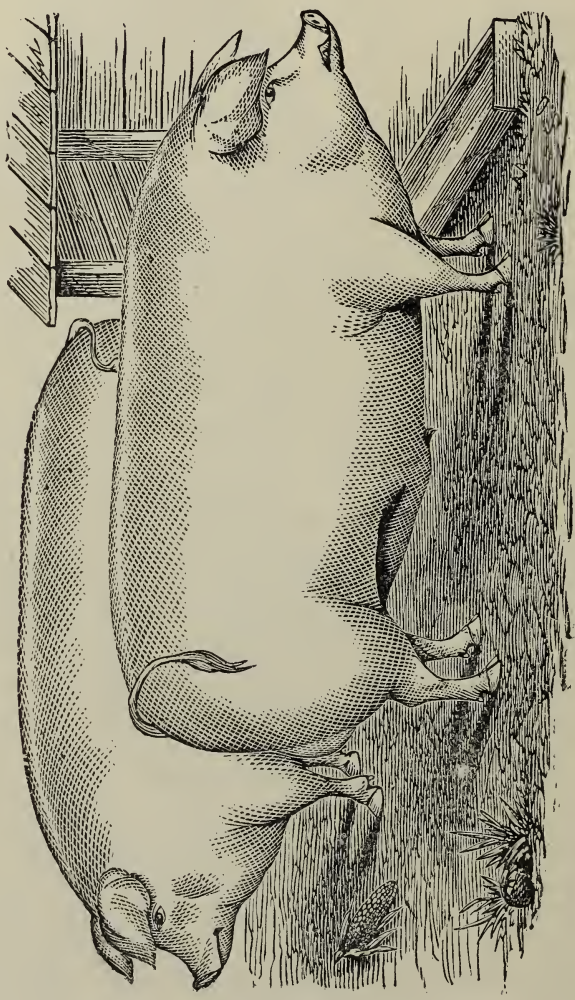
Characteristics of Poland-China.

The best specimens have good length, short legs, broad, straight backs, deep sides, flanking well down on the leg, very broad, full, square hams and shoulders, drooping ears, short heads, wide between the eyes, of spotted or dark color; are hardy, vigorous and prolific, and when fat are models, combining the excellences of both large and small breeds.

XI. Chester Whites.

The Chester Whites originated in Chester county, Pennsylvania, about 1818, through the importation of a pair of fine pigs from Bedfordshire, England, by Captain James Jeffries. These were inter-bred with the best stock then existing in that county, and by careful selections a permanent strain of large, easily fattened, quiet hogs were produced, which continued to breed with great uniformity. Something like thirty years ago some attempts were made to cross the Suffolk and Berkshire upon them, but it was discontinued as not being considered an improvement, and the best specimens to-day should be pure white, with no black about them whatever.

In the West this breed became very popular some years ago, and still is in many parts of the Northwest. Farther south, however, in the true corn zone, pure white hogs of any breed are not favored. They are thought not to stand out-door usage so well as black or nearly black swine. Where great weights are required the Chesters will always be liked.



CHESTER WHITE HOGS.

The following may be given as the characteristics of these hogs: Head short and broad between the eyes; ears thin, projecting forward and lopping at the point; neck short and thick; jowl large; body lengthy and deep; back broad; hams full and deep; legs short and well set under the body; coat thin, white and straight; (if a little wavy it is no objection). The tail should be small and with no bristles.

XII. Jersey Reds.

This large and rather coarse breed of hogs have been somewhat disseminated in the West. They are certainly a hardy breed, and well adapted to new countries where there is good range and mast. Their history seems to be as follows:

The positive origin of this family of swine is unknown. They have been bred in portions of the State of New Jersey for upwards of fifty years, and with many farmers are considered to be a most valuable family. They are of large size and capable of making heavy growth, 500 and 600 pounds' weight being common. They are now extensively bred in the middle and southern portions of New Jersey. In some neighborhoods they are bred quite uniform, being of dark red color; while in other sections they are more sandy and often patched with white. They are probably descended from the old importations of Berkshires, as there is no record of the Tamworth, the red hog of England, ever having been brought into this country, nor is this likely, as the Tamworth was not considered a valuable breed, and was confined to a limited area. The Reds resemble the old Berkshires in many respects, but are now much coarser than the improved swine of this breed.

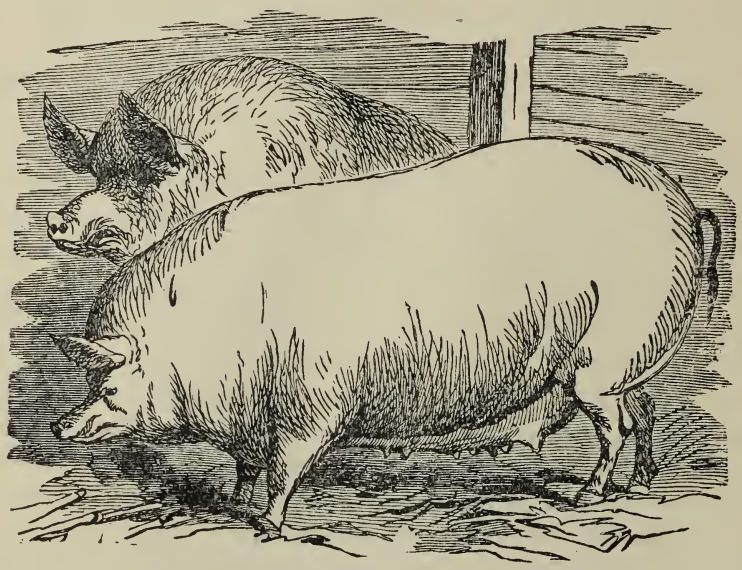
A good specimen of Jersey Red should be red in color, with a snout of moderate length, large top ears, small head in proportion to the size and length of the body, standing high and rangy on their legs; bone coarse, having tail and brush and hair coarse, inclining to bristles on the back.

XIII. Cheshires.

This is a comparatively modern breed, if indeed it is yet fully enough established to be called a breed. It has been somewhat disseminated in various parts of the United States, and for villagers and small farmers, possesses about all the good qualities of the Suffolk, without some of their disabilities. They are said to have originated in Jefferson county, New York, from a pair of pigs sent from Albany under the name of Cheshire. It was probably a pet name for an exceptionally good pair of pigs. Since then they have been crossed with Yorkshires and other pure white breeds, until of late years by selection they have become uniform in their make up.

The so-called Cheshires are pure white in color, with little hair. They are not uniform in this respect, as pigs in the same litter differ widely in the amount of hair. The snout is often long, but very slender and fine. The jowls are plump, and the ear erect, fine and thin. The shoulders are wide and the hams full. The flesh of these hogs is fine-grained, and

they are commended on account of the extra amount of mess pork in proportion to the amount of offal The tails of the pigs frequently drop off when young.



IMPROVED CHESHIRE.

Recapitulation of Breeds.

The principal English breeds are as they were known twenty years ago, the Berkshire, the Essex and the Yorkshire. The Berkshire is a medium breed weighing at full maturity up to 500 pounds. There are large and small Berkshire, but the medium family is the most valuable. They are now bred entirely black except a dash of white in the face and white feet.

The Essex is all black, or rather a blue black, and will weigh up to 450 pounds at maturity. They are one of the most stylish of the small English breeds, as they are the largest of the small breeds, and to our mind the best of the small breeds for the West—quite good feeders, handsome and making good pork.

The Yorkshires are divided into three classes, small Yorkshires, medium Yorkshires, and large Yorkshires. The so called Prince Albert Suffolks are small Yorkshires, and the best of the small white breeds. All the Yorkshires have occasional dark spots on the skin. The hair, however, is white, and these dark spots are not indications of impurity of blood but rather the reverse.

The American breeds, in the best repute, are first, the Poland-China,

sometimes called, in Ohio, Magie. Twenty years ago they were coarse black and white hogs, with occasional sandy markings. Of late years they have been, through careful breeding and selection, refined, and are now bred in the West, nearly black, the white, in the most approved strains, being distributed pretty equally over the head and body in flecks and irregular patches. They are the most widely distributed of any American breed in the West, and fully deserve all that is claimed for them, as large, quiet, early matured, and kindly feeding hogs.

The Jefferson county, New York, so called Cheshires, are, as before stated, but modified Yorkshires, but in every respect stylish hogs, feeding well and making good pork, and are well adapted for small farms and for feeding in pens. The so called Hospital breed, or Morgan county hog of Illinois, which some years ago gained considerable repute, are undoubtedly, modified Yorkshires, and in no respect superior to that well known breed. They were produced by crossing the Suffolk on the best white hogs of that county. Within the last five years they have ceased to attract attention.

CHAPTER II.

BREEDING AND MANAGEMENT.

IMPORTANCE OF SWINE. —— A BACK WOODS HOG. —— FIXING AND HOLDING THE CHARACTERISTICS. —— SELECTION ALWAYS IMPORTANT. —— BREEDING AGE OF SWINE. —— CARE OF BREEDING SOWS. —— WEANING. —— MANAGEMENT OF SWINE. —— ABSOLUTE CLEANLINESS NECESSARY. —— SUMMARY.

Importance of Swine.

The breeding and management of swine constitutes one of the most important agricultural interests in the West, and should do so in the South. To be successful none but the best breeds should be allowed on the farm. The fecundity of swine leaves no excuse for holding on to land pikes and the descendants of semi-wild breeds that must be run down by dog and rifle, in order, when they are killed to get a small quantity of inferior meat. A boar of any of the improved breeds will be sufficient for six or eight sows, and the increase is so astonishing when there is no epidemic disease, that it would from a single pair take but three years to stock the largest farm. It should be unnecessary to pursue this matter further. There is no class of farm stock that pays better, as between indifferent and good breeds, than hogs, and the wonder is that in some sections of the country farmers still cling to a breed of grunters that will always greet you with a snort and a boh-o-o, and which no feeding can fill—in fact animals like those shown on the following page—fully a match for the average dog, always hungry, ready to eat anything that falls in their way, even to half grown children occasionally, but which when wanted for meat are nowhere within shooting distance.

The very first requisite, however, in keeping any improved breeds, or in fact any breed from which money is to be made, is the best of feeding, and that daily, from the time they are born until they are slaughtered.

A BACK WOODS HOG.

The hog is simply a machine for making what is to be converted into lard, bacon, salt pork and hams. The average daily gain is a gradually decreasing quantity from month to month, until after a certain time nothing more can be gained in weight. This ought to be sufficient to be said upon this point. You can neither breed, nor keep a breed profitably by starving or allowing them to shift for themselves. As elsewhere, so in stock-raising, it holds true that what costs little to acquire, brings little at sale. Care and labor to secure the best will always pay the most.

Fixing and Holding the Characteristics.

In breeding swine, however good or perfect the breed, they will surely degenerate unless the greatest care in selection is pursued. Many persons wonder why it is that from the prolific nature of swine, the country is not soon stocked with none but the most superior animals. The simple reason is, the want of accurate judgment and care in selection; the error will be plainly seen by noting what we say farther on. Indeed, what has been said in previous pages on this general topic will apply equally well at this point. Care in selection and breeding is fundamental to success.

Selection Always Important.

In animals usually having but one young at a time, the progeny pretty uniformly partake of the nature of both parents, and are bred with tolerably uniform results. In animals producing a number of young at a time, the progeny will be found to vary very considerably in the same litter. Thus the selection of those specimens that partake of uniform and characteristic excellence becomes of the first importance, since unwise selections will result in carrying the breeder farther and farther from the excellent points to be perpetuated. Again, heredity, that is throwing back to an original type, or rather in the sense in which we use it, inheriting certain fixables, as constitutional vigor, inclination to fat, etc., is shown far more clearly in animals having many young at a time, than those having only one young. The progeny will not only vary more in particular animals, but certain characteristics will reappear by reversion after a greater number of generations, in animals having many young at a time, and to a greater degree than in those usually having but one. At least such is our experience. Hence, as we have stated, absolute necessity of the strictest care, is not only necessary in breeding, but in the selection of animals for future breeding.

In domestic animals it is a matter of common observation that the temper and other peculiarities of individuals are determined by inheritance. Thus, virtually, quietness of disposition, or mildness, tractability or viciousness, courage or timidity, are constantly shown. Now from the general law that like produces like, and the well determined law that variation is a constant integer in all cross bred animals, and from our own observation that it is often intensified in animals having many young at a litter, the full force, as regards judgment in selection will be apparent; and the fact that the country is not soon filled up with superior breeds of hogs is due mainly to the want of proper care in the selection of the breeding animals, and also from a lack of accurate knowledge and ability to nicely discriminate by the breeder, in regard to form, constitutional vigor, and excellent points in the young animals selected as breeders. Absolute accuracy in this respect is in fact possessed by but few individuals in a generation. There must first be a natural tact inherently possessed and digested and matured by years of study and observation

Breeding Age of Swine.

The sow is capable of breeding at about seven months of age, and the boar is fit for service at the age of one year. As a rule, however, the sow should not be allowed to farrow under the age of fifteen months, and the boar is not fit for continued service until he is eighteen months old.

The sow may, under exceptional circumstances, be made to breed three times in a year, but two litters are all that should be allowed. Many of our best breeders do not allow but one litter a year, where the produce is simply required for making pork, and under certain circumstances this is not incompatible with economical management.

A Warm Farrowing Place Necessary.

The young pig is even more tender than the new-born lamb. If they get chilled before they suck it is difficult to save them. Where there are good conveniences for warming the farrowing pen, sows may have their first litter in March, and if put with the boar the fourth day after farrowing they will generally receive him. This will bring the next litter in the Summer, a very good time for pigs to be wintered. If the sow do not catch the first time she will not come in heat until the pigs are weaned. Yet this will not throw the next litter later than September. If good facilities are not had for keeping the early litters warm, the farrowing had better be deferred until May, or at the time of grass, according to the latitude.

Gestation.

Gestation continues about four months. Three months, three weeks and three days is considered the average time, and it is not far out of the way. A variation will sometimes be found of thirty days. Young animals, and those of feeble constitutions carry their young for a shorter time than mature and strong animals, and sows usually remain prolific for five or six years, and unless they get overloaded with fat, old sows are more constant and careful mothers than young ones.

Care of Breeding Sows.

The sows that naturally have a strong tendency to fatten may be bred at nine months old, and should be kept breeding pretty steadily, and be fed only sufficient to keep them strong and in fair flesh. During gestation the sows should be kept in good heart but not fat. When potatoes are plenty they can be substituted boiled, and in connection with milk will be most excellent feed. In any event they must have plenty of succulent food—clover, pig-weed, or other green food in Summer, and roots of some kind in Winter. We have always kept a patch of artichokes for Fall and Winter, when the ground was not frozen for them to root and amuse themselves in. The practice of ringing breeding sows to keep

them from rooting is vicious in the extreme. We have never practiced it at all with any hogs. To remain healthy they must root some. It is their natural instinct. If the pasture be clover, and in the rotation to be followed with other crops, the damage by rooting will be light in comparison with the health of the swine. Loss at one point will be fully compensated at the other.

When the sow is near her time her food should be of such a nature as to keep up her strength and give due sustenance to the young but not stimulating. When the pigs are three or five days old, and danger of inflammation is past, feed liberally, and with rich sloppy food to induce a good flow of milk. But under no circumstances feed so as to make the young pigs unduly fat. Skimmed milk and the mill refuse of wheat, what is known as mill feed, is best, but in the absence of this potatoes, pumpkins and other roots in the Fall, or boiled beets in the Spring, with corn meal enough to keep the sow in good heart, makes admirable food. When there is grass to be had, the sow should be allowed all she will eat. Thus you may get the very best results both in the health and continued usefulness of the sow, and the constitutional growth and vigor of the young pigs.

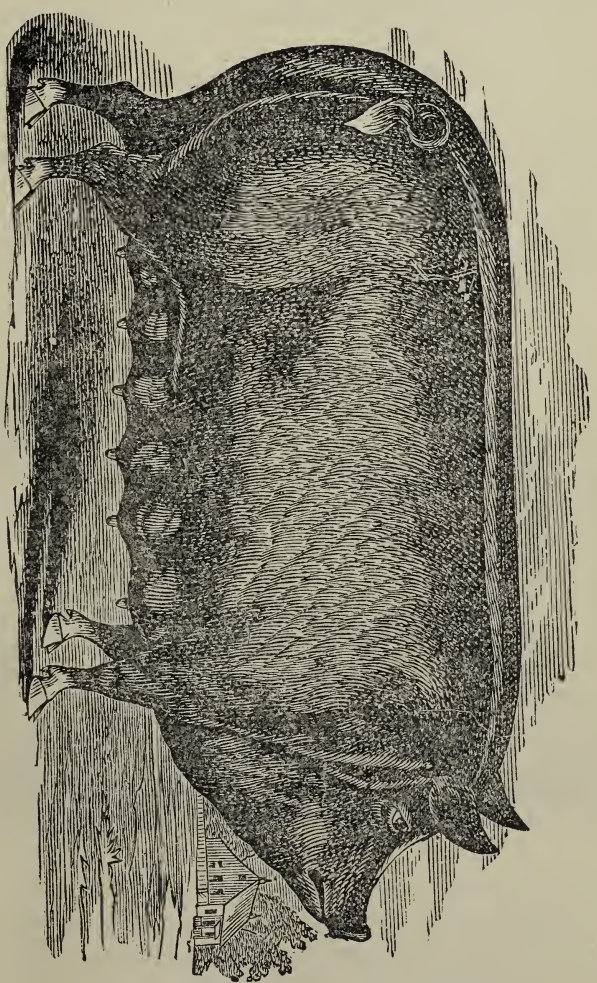
Weaning.

The young pig as we have shown is born ready for work. That is, it has teeth that in a short time are competent to grind and prepare food for the stomach. We should wean at six weeks old, allow all the skimmed milk and butter-milk possible to the growing pigs, and with it after the pig is two months old, a fair proportion of ground wheat skimmings, or light rye, barley, etc., ground and made into mush, to be mixed with the milk as a tolerably thin slop. Teach the pig early to eat grass, and at three months old he will take care of himself on good pasture with all the corn he will eat at night. By this means the older stock are early freed from care of the young and become ready for other uses.

At the age of two or three weeks the pigs should be gelded, so they may be well over the difficulty before weaning time. Keep rings out of the noses of young pigs. They have been the means of spreading contagious diseases. We prefer slitting the cartilage of the nose, or cutting a notch in it at the time of gelding, if it is absolutely necessary that they do not root. At all events it is time enough to do the ringing the second year, if to be kept over. But by proper care if the litters of pigs come early, any of the better breeds may be turned off the next Christmas, and from this time until the first of February become fat, and of as heavy weight as is profitable in the markets.

Management of Swine.

Hogs are not succeptible to cold when fat. Nature in denying them much hair, has provided them with a thick layer of fat under the skin that acts in the same manner to the skin outside as a covering of hair in other animals. It has also given them the instinct of providing themselves



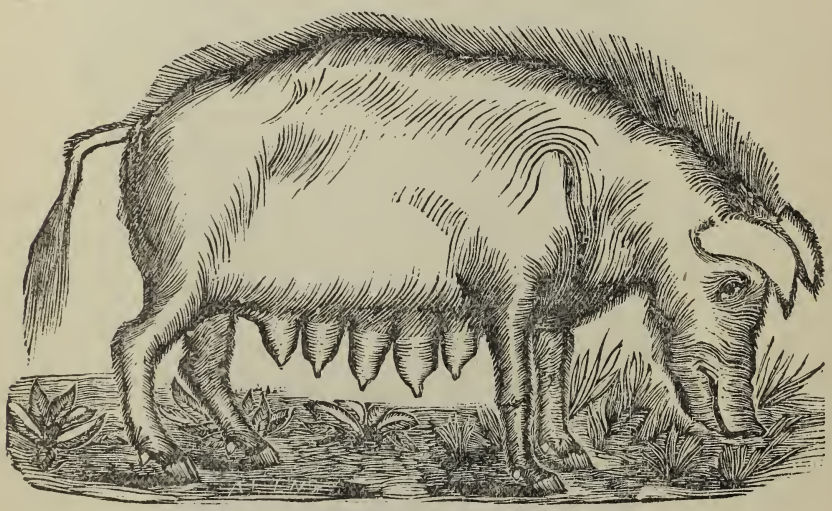
BERKSHIRE SOW, BREEDER.

warm beds in sheltered situations in which to lie, and, in addition, given them the inclination to lie together in considerable numbers; and kept together, with insufficient shelter, they will pile together in such numbers as to over lie each other, by which the weaker ones are often smothered. We have known those who considered themselves sensible men, to get up in cold winter nights and go to the hog yard and separate the drove,

when so piled. It is about on a par with the whipping and dogging of cattle about a yard at night to get up warmth. A more sensible and cheaper plan would be to provide comfortable quarters, where they might lie warm, and separate them into gangs, according to age and strength. Thus with plenty of fat next the skin, and good liberal feeding, very little difficulty will be experienced, in keeping them growing steadily, until of a sufficient age for the slaughter pen.

Absolute Cleanliness Necessary.

Of all farm animals hogs especially must have plenty of water. It should also be pure. Swine breeders can not too soon disabuse themselves of the idea that swine are dirty, or filthy feeders, or that they naturally incline to wallow in the mud. There are no farm animals nicer in the food they eat than swine if allowed to be. It is true, they are



HAZEL-SPLITTER.

omnivorous feeders. So is man. Like man, although they eat fish, flesh, fowl, vegetables, roots, and grain, they like it fresh. If forced by hunger they will eat disgusting substances, so again will man. The elephant, the rhinoceros, hippopotamus, and tapir, seek the water to clean and cool themselves in Summer, like all pachydermatous animals. The wild men like swine will cover themselves with mud to ward off the attacks of biting and stinging insects. In their wild state the nearest tree furnishes to swine the means of rubbing it off when dry, and the rubbing post furnishes them the means of cleaning their skins in a state of domesticity.

If kept from the attacks of flies, they will not wallow in the mud but in the cleanest water they can find, and stagnant water they will not drink at all, unless forced to do so, by dire necessity.

The sagacious breeder and feeder will understands this; they also understand the danger of malignant diseases attacking their swine when forced to wallow and drink impure water. Hence they strive by every means in their power that swine are kept away from these causes of disease and death, and thus such would be almost entirely exempt, except that there are always men enough of the shiftless type in a neighborhood whose stock take and spread contagion to their neighbors. We do not know how we can illustrate more forcibly the two types of breeders than by the cut given of a sow of an improved breed properly kept, and of a sow of the "hazel splitting" variety, improperly kept. The one in a dry, firm pasture, with plenty of pure water, the other on a half marsh, and apparently made to succumb from miasmatic influences.

Summary.

Hogs, and especially pigs in confinement often suffer for want of water. No matter how sloppy the food they should always have pure water within reach. If they can have a bathing place in Summer it will add much to their health, and assist much in fattening. Swine, in confinement, should always have charcoal, bituminous coal, salt and wood ashes within reach. They often suffer from acidity of the stomach and the remedy being near the swine will always use it.

Oil cake mixed with the feed of swine when suckling pigs, a gill a day, assists the milk secretion. It should not be given to pigs. As they begin to eat they should have a trough where they can go and feed but which the sow cannot get at.

Bran is not valuable for swine. Where highly concentrated food is given it is well to have a little dry bran in a separate trough, so the hogs can take it when they want it.

If ordinary diarrhœa attacks pigs give a porridge of sweet skimmed milk and flour. For constipation give two or three drachms of soap dissolved in an ordinary sized tumbler of water, and repeat if necessary in eight hours, or give as an injection. It is also a good diuretic and for acid stomach.

Provide a strong scratching post. Bore inch and a half holes at intervals to accommodate hogs of different sizes, and drive in pins letting them project an inch and a half.

Castrate pigs before they are weaned, say not later than two weeks before weaning time.

CHAPTER III.

FEEDING AND SHELTER.

GOOD VS. BAD FOOD.——SUMMER FEEDING.——OTHER SUMMER FOODS.——ROOTS.——THE GRAINS.——FEEDING SOUTH.——MAST.——FEEDING IN CONFINEMENT.——HOG BARNS.——A CROSS BARN.——A SIMPLE PEN.——SUMMARY.——LIGHT VS. HEAVY HOGS.

Good vs. Bad Food.

Vegetables and grain are the basis of success in the making of pork whatever the breed may be. Hogs kept about large stables or distillery yards, where they get only offal, or fed in butcher's yards, on the refuse offal of the slaughter house, are unfit for human food. They are liable to become infested with trichina, and, therefore, no breeder and especially no feeder should buy animals from such localities. In fact there is only one redeeming feature among the disgusting filth and nastiness in which they are fed—they are generally provided with pure water, and warm shelter.

Summer Feeding.

Pasturage is of the first importance. This should be ample. In pasturing swine, but few varieties of grass are required. Clover, both white and red, will be the main reliance. In all that region where red and white clover are not natural to the soil, and where alfalfa (lucerne) and other members of the pulse family do well, these may be substituted. Swine take kindly to blue grass, when it is young, and to orchard grass. They do not refuse timothy, but timothy has a bulbous root just at the surface of the earth. This swine eat, and thus destroy the grass. Rye

and oats make good pasturage for hogs. Rye grass and foul meadow grass are also well relished. In this respect the feeder should experiment with grasses, to be cut and given in the pen, and then feed to such varieties as do best, and are most eagerly eaten. Of weeds, purslain, (*portulaca oleracea*), lambs quarter, also called pigweed, (*chenapodium album*) and the green amaranth, also called pigweed, (*amarantus hybridus*) are the most common of our native and introduced weeds that are valuable as green food for swine. There is also a native weed growing in Illinois and along the alluvial banks of the Mississippi and northward; the winged pigweed, (*cycloma platyphyllium*) that is much liked by swine. Yet the list of plants eaten by them is not large, about eighty species comprising the whole.

Other Summer Foods.

Besides clover, the grasses, and weeds, there are other plants that may come in during the Summer, and be used with profit. Oats and peas may be sown together, two bushels of oats and one of peas, together, per acre, as early in the Spring as the ground is in fair condition for working. The swine may be turned into the field when the crop is ripe, being confined to given space, by a hurdle fence, which is to be removed as they eat clean. A better way, however, is to harvest and thresh, and feed either soaked or dry. Later, Summer squashes and pumpkins will come in, to be followed by artichokes in the Autumn. We do not advise any of these foods except grass on the score of economy. Corn and grass are the cheapest food in all the West, so far as mere cost of production is concerned. But unless the health of swine is retained, there is no profit. Hence the necessity of these additional foods.

Roots.

Rutabagas make an excellent Winter food for swine in connection with corn; they are easily and cheaply raised, as we have already stated. Parsnips are also generally liked, either raw or cooked. Beets are also a good Winter feed boiled with meal. The tops are also occasionally relished. Cabbage is a cheap and wholesome food; they are not, however, cheaply kept over Winter. They may be used with profit up to the first of January.

The Grains.

These, after all, must be the main dependence, both in raising and fattening swine. The kind of grain fed will, of course, depend upon the

climate and region where raised. Where corn is a sure crop, it must be relied on almost entirely. The assertions of theorists, that it is unfit for feeding, except during the short fattening season, although the merest twaddle, in the sense they intended it, will, from another point of view, be correct. The fattening season of swine should be from the time they are weaned until they are slaughtered. Swine for pork should never lose in condition from the time they were born until turned off for the butcher. The feeding of all the corn they will eat in connection with grass and other food, to keep them healthy, and which will apply with equal force, whatever the grain fed, will be found not only the most economical throughout the West and Southwest, but in all that region of country where corn is natural to the soil and climate, or where it may be cheaply bought.

Feeding South.

In nearly all the country South, corn may be cheaply raised as a part of the rotation. Here corn must be the main stay, supplemented by such grasses and plants as are natural to the region. The artichoke will do well much further south than is generally supposed, and some of the tuberous varieties may undoubtedly be found well down to the tropics. When it can be profitably cultivated, the Jerusalem artichoke should be used. The name Jerusalem is a corruption of the Italian name Girasole, meaning sunflower, the botanical name being *Helianthus tuberosus*, or the tuberous rooted sunflower.

Chafas, a tuberous rooted grass, (Cyperus), has become widely naturalized in the South, and is highly spoken of for feeding swine, since like artichokes, the hogs are left to gather them for themselves, and unlike the artichokes, they are most nutritious and fattening. They are exceedingly easy to cultivate, but are sometimes said to be difficult to extirpate South. This, however, is probably incorrect, since from their very nature, a thorough Summer fallow will kill. North of thirty-nine degrees they do not survive the Winter. In fact, if frozen anywhere, they are killed.

Mast.

In all the great timbered region South, tree seeds, acorns, beechnuts, chestnuts, the softer shelled hickorynuts, and hazelnuts, form a most valuable food for swine. They should be utilized to their fullest extent. So papaws, persimmons, and the other wild fruits of the forests South, may be made available in the making of pork. Where hogs can have

plenty of range, they will do very well with a little feeding, are generally entirely healthy, and upon being put up to fatten, a very little grain suffices, if only attention has been paid to get the proper breed. For the South, we believe the Berkshire, or crosses of the Berkshire on the best native sows to be one of the most profitable breeds. The Poland-China of American breeds will be found most valuable for breeders and raisers at the South.

Feeding in Confinement.

In all the great swine growing regions, where from twenty-five to five hundred hogs are annually fattened and sold from single farms, the life of the animals must necessarily be passed out-of-doors. So far as the breeding stock, and the first few months of the life of the pigs are concerned this is always best, both from an economical and sanitary point of view. There are, however, many small farmers, who annually fatten, from what they require for family use, up to fifteen or twenty head a year, who find it most convenient and economical to feed and fatten both in Summer and Winter in pens. All this large class must depend, first, on the skim milk, buttermilk and whey, and upon the slop of the kitchen for feeding; second, upon clover, cut and fed, weeds and other refuse material about the farm, and lastly and principally on corn either ground or raw. It is better for all this class that the pens when built be planned so as to combine ease of handling with security and comfort of the animals.

Hog Barns.

The hog house need not be an expensive building. For a few hogs it may be in the form of a parallelogram, with a passage way in the middle five feet wide, with pens opening into roomy yards outside. Each pen should be provided with a swing door, hinged at the top, so the hogs in passing out and in may raise and lower it themselves. This they soon learn to do. The pens may be about eight feet by ten feet, which, if kept clean, will accommodate three or four hogs each. Thus, a range of pens on each side ten feet deep and a five feet passage way between will require a building twenty-five feet wide. A square building of this size will feed twenty-four hogs. If a less number is required to be fed the building may be twenty-five feet one way, and, say sixteen feet the other way, allowing for pens. If fifty hogs are to be kept it will require six pens on a side, and the building, to secure proper accommodation, must be twenty-five by forty-eight feet.

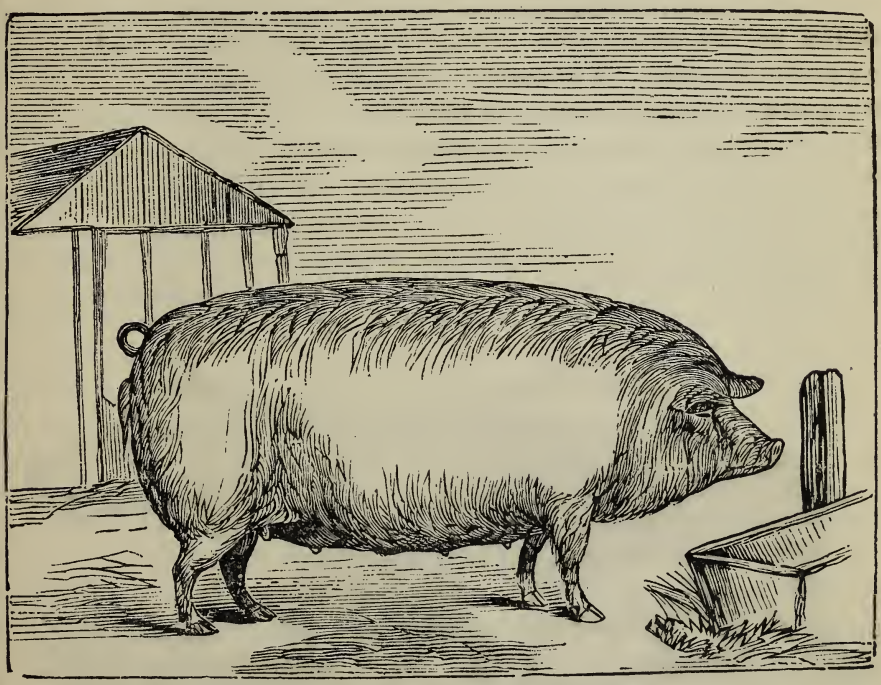
A Cross Barn.

If a large number of hogs are to be kept it is better that there be a central building twenty-five feet square, sixteen feet of which is to be used as a room for the boiler and for storing and preparing the food. Extensions from this on every side are to be built twenty-five feet wide, and as long as necessary to accommodate any required number of hogs A tight box on four small iron wheels arranged so it will turn short corners will carry the food to every pen, which should of course be provided with a good trough, into which the feed may be easily poured. This with extensions, each forty feet long and twenty-five feet wide, will give you a cross barn, good for from 150 to 160 full grown hogs; and these extensions may be carried out to accommodate 500, if necessary, but if more than 100 hogs are to be kept the central building should be forty feet square, three stories high, the upper stories used as a granary with corn cribs next the outside. Twenty feet square should be given up for the storage and stove room below, and the breeding pens placed next on account of the greater warmth. In a building of this description near Chicago, we for years kept and fed, in connection with a large market garden, from 400 to 500 annually, the principal food used being the daily waste from large hotel kitchens, which we daily supplied with vegetables, the garden furnishing economically the necessary green vegetable food. We had no sickness or difficulty worth mentioning. The water supply was ample and pure; the pens were daily cleaned and washed in warm weather; the drainage was carefully attended to; salt and bituminous coal was supplied, so the hogs could take either at will, and we always had fat hogs to supply city butchers, and the pigs were turned off at about eight or nine months old, weighing from 250 to 300 pounds each. This was about fifteen years ago, and the breeds then kept were Chester county sows, crossed with Yorkshire or Suffolk boars.

A Simple Pen.

When swine are only to be kept in pens during the period of final fattening, and are allowed to run at large in the fields in the Summer, a pen fourteen feet wide, and of sufficient length to accommodate the number of hogs kept, will suffice. It should be floored tight, and one-half of the width allowed for sleeping. These must be closed in and roofed, the feeding pen being open to the weather, the whole being divided into compartments or spaces, eight feet one way, or wide enough for four hogs to feed abreast. This also is a good form when not more than a dozen hogs are to be kept.

Still another plan is to select a yard, in a dry, well drained place, allowing twenty feet square for each ten hogs; thus a lot forty feet square would accomodate twenty hogs. Along the middle of the pen, a

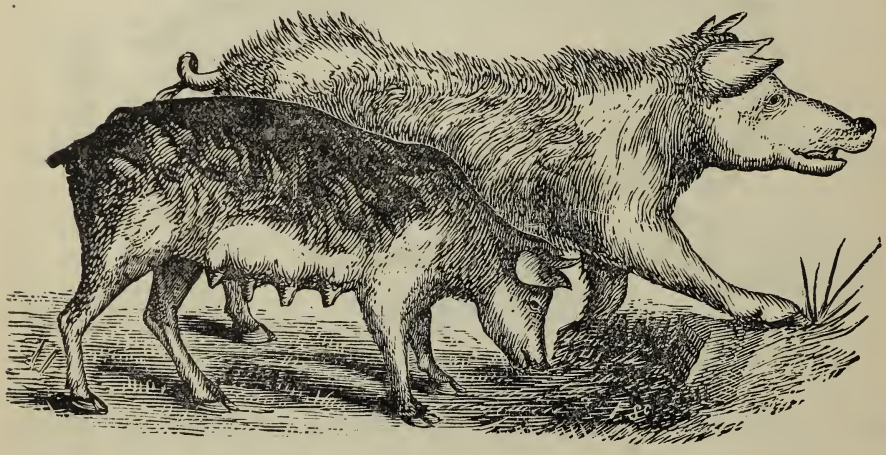


BREEDER IN GOOD FLESH.

bedding place is built, sixteen feet wide, with a partition in the middle, and divided the other way every twenty feet by partitions. The feeding place should be floored, eight feet wide, and have a low trough two feet wide, along the side for holding ear corn. Unless the season is very wet and muddy, hogs do very well thus kept. If wet, they must be kept out of the mud by means of hay and litter thrown into the yards from time to time, and the sleeping places must be kept well bedded. Kept in either of the ways we have designated, your hogs will go to the butcher fat, and showing a profit on the right side of the ledger, and your breeding sows will look like the illustration of a well-bred animal, which we give in ordinarily good breeding flesh, on this page. If on the other hand, you let your hogs shift for themselves, running wild over the prairie, or running about in the woods, they will, as the illustration on next page shows, come out pretty much like "Arkansas tooth-picks." Stock of this kind may be able to care for itself, but it will yield only a paltry return in the market.

Summary.

In what we have said in relation to feeding in close pens, we are not to be understood as advising the practice on the farm. There should be plenty of pasture in Summer, and plenty of pure water always. Without this no one can succeed. There must be protection from insects and heat in Summer. The first may be perfectly secured by providing a dark place to which the hogs can retire at will. In Winter there must be warm, dry and otherwise comfortable shelter provided, and there must also be plenty of good food, at all times. Of all animals the hog, at least, must not be allowed to lose flesh from the time it is born until it is killed. When fat, kill at once, unless the market happens so that it will pay to hold for a short time for a turn. As a hog becomes fat, it eats



"ARKANSAS TOOTH-PICKS."

less and less, and it also fattens more and more slowly. Nevertheless, the same daily animal waste goes on. Many good feeders are so particular that they weigh their hogs every two weeks, and note the gain Then they are able to determine just how much their stock is improving, and also as to the proper time for turning them off. If not ready, or the season and prices are not right, they increase the condition of the food given, so that the small quantity taken shall make up in richness what it lacks in quantity. This class seldom sell stock over twelve months old, and many of our best feeders sell their hogs at ten months old, which will turn the scales at from three hundred to four hundred pounds each. Such feeders never keep hogs two Summers and one Winter, in order to get an average of two hundred pounds each.

Light vs. Heavy Hogs.

Years ago, when lard and side pork were the principal hog products looked for, the heavier the hog, the better the price. We once sold a hog weighing 650 pounds for fifteen cents a pound. That was in war-times, and it brought one cent per pound over the price paid for light and well fattened hogs. The same animal to-day, would not bring within a cent a pound, of what nice young nine and ten months, well fattened pigs would, in any of our principal markets. To get the weight named, the hog was fed two years and a half. Take three pigs against this one. The difference in the first cost of the three sucklings as against the one, would not exceed three dollars. The three pigs will be fed nine months, and weigh 600 pounds,—(we have made pigs farrowed in March and killed the next January, weigh *dressed*, up to 380 pounds, and have more than once turned off such pigs at ten months old weighing alive over 300 pounds average) the other must be fed almost three years, and you must be a good feeder if you make him weigh 600 pounds. In the first case, you have fed nine months each, or twenty-seven months on the three pigs for 600 pounds, and in the other case, you have fed thirty-six months for the same weight. The one big hog has eaten more corn than the three pigs, and yet the three pigs weighing the same as the one will bring about six dollars more, giving you three dollars on the original purchase, as between the three and one, and a very considerable amount of corn on the credit side of your account book. You don't believe it? Examine the tables we have given on feeding and turning off cattle young, as against feeding until they were mature. We could show many instances fully as convincing as this, in the case of hogs; but why pile up testimony after the argument is conclusively established beyond controversy.

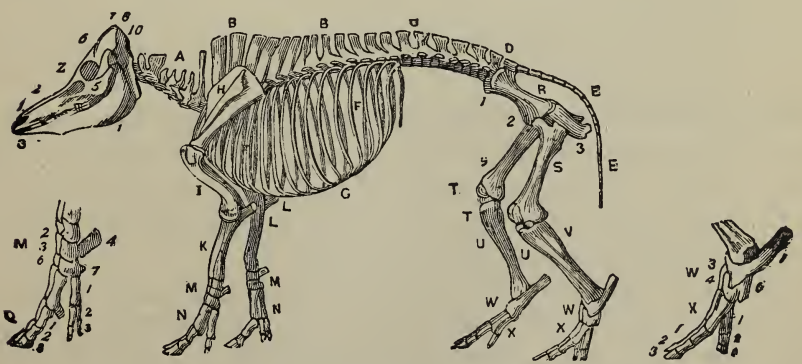
DISEASES OF SWINE.

CAUSES, SYMPTOMS AND CURE.

CHAPTER I.

DISEASES OF SWINE.

EXPLANATION OF CUT. —— DIFFICULTY IN ADMINISTERING MEDICINE. —— GOOD NURSING THE ESSENTIAL. ——MALIGNANT AND CONTAGIOUS DISEASES.——MALIGNANT EPIZOOTIC CATARRH.——HOW TO KNOW IT. —— WHAT TO DO. —— INTESTINAL "HOG CHOLERA."—— HOW TO KNOW IT.——CAUSES. —— TREATMENT. —— PREVENTION. —— CONTAGIOUS PNEUMO-ENTERITIS. —— ITS ORIGIN. ——THE ERYSIPELATOUS FORM.——THE FORM MALIGNANT SORE THROAT.—— WHAT TO DO.——MALIGNANT ANTHRAX, SPLENIC FEVER.——TRUE CHARLON. ——CONTAGIOUS PNEUMO-ENTERITIS. —— INFLAMMATORY DISEASES. —— QUINSEY, OR STRANGLES.——RISING OF THE LIGHTS.——PNEUMONIA.——CATARRH IN THE HEAD.——DISEASE OF THE SKIN.——MEASLES.——HOW TO KNOW IT. ——THE LARD WORM.——WHAT TO DO. —— TRICHINA SPIRALIS.——HOW TO CURE.——LICE.——DIARRHEA.——SUMMARY.



SKELETON OF THE HOG.

Explanation—*A*—Cervical vertebræ. *B*, *B*—Dorsal vertebræ. *C*—Lumbar vertebræ. *D*—Sacrum. *E*, *E*—Coccygeal bones. *F*, *F*—Ribs. *G*—Costal cartilages. *H*—Scapula. *I*—Humerus. *K*, *K*—Radius. *L*—Ulna. *M*—Carpus, or knee. 1. Scaphoid. 2. Semilunar. 3. Cuneiform. 4. Trapezium. 5. Trapezoid. 6. Os magnum. 7. Unciform. 8. Pisiform. *N*, *N*—Large meta-

carpal, or cannon. *O*—Small metacarpal. *P*, *P*—Sesamoid bones. *Q*, *Q*—Phalanges. 1. Os suffraginis, or pastern bone. 2. Os coronal. 3. Os pedis. *R*—Pelvis. (Fore-leg of pig. Phalanges 1, 2, 3). 1. Ileum. 2. Pubis. 3. Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hock. 1. Os calcis. 2. Astragalus. 3. Cuneiform magnum. 4. Cuneiform medium. 5. Cuneiform parvum. 6. Cuboid. 3, 6. Cubo cuneiform. *X*—Large metatarsal (Hind-leg of pig. Phalanges 1, 2, 3). *Y*—Small metatarsal. *Z*—Head. 1. Inferior maxilla. 2. Superior maxilla. 3. Anterior maxilla. 4. Nasal bone. 5. Molar. 6. Frontal. 7. Parietal. 8. Occipital. 9. Lachrymal. 10. Squamous-tempoid. 11. Petrous-tempoid.

Difficulty in Administering Medicine.

No class of farm animals are so difficult to treat in sickness as swine. The horse, the cow, and the sheep, may have medicine administered to them by an intelligent operator with comparatively little difficulty. Not so swine. They resist every effort with their utmost strength, and medicine can only be forced down by main strength, the resistance itself, being, in nine cases out of ten more injurious, than the good the medicine may do. When it must be administered by the mouth, the best means we have ever found, is to place the hog in a narrow pen in which he can not turn round, put a slip noose around the upper jaw, turn the medicine —in the case of a drench—down from a horn, or when it may be admissible give it in the form of an injection. In the case of boluses they may be laid on the back of the tongue, next the palate, and the animal thus made to swallow.

Good Nursing the Essential.

For the reason that medicine is so difficult to administer, it is always best, when the hog will eat or drink to disguise the dose in some food or drink it likes. In fact our practice has always been, if medicine could not be so administered, to let good nursing and care be the chief dependence in bringing the animal safely through.

In the case of those malignant forms of epidemic and contagious diseases which, under the common name of hog cholera, have so frequently scourged the West within the last few years, unless the affected animals are treated during the first or symptomatic stage, the only course to pursue is to isolate every diseased animal from the herd as soon as found, and remove the well animals to a separate place where they are not in danger, and above all where they cannot come in contact with other hogs; then with such medicine as they will eat in food or drink trust to nature and good care to bring them safely through.

So far there has been but little success attending the treatment of these diseases, probably from the fact that the incubative stage of the disease was passed and the animals beyond the reach of remedial means before the owners were aware that the animals were attacked. In the treatment of the diseases of swine, we shall first describe fully the three principal forms of those malignant diseases termed hog cholera, and for which there are so many specifics advertised—some of them by men so ignorant as to call all distempers hog cholera, and prescribe identical treatment for diseases that require entirely different remedies.

Malignant and Contagious Diseases.

There are three principal forms of malignant diseases, called hog cholera. The first is malignant epizootic catarrh, which in 1875 and 1876 swept over Illinois, Missouri, and neighboring States, destroying vast numbers of swine; next the disease noticed by Professor Kline, of England, and described as contagious pneumo-enteritis; the third, anthrax and splenic fever and a form of intestinal fever closely allied to the last if not identical, and which Dr. Law designates as intestinal fever or hog cholera.

Malignant Epizootic Catarrh.

This disease, if it does not originate in filthy yards and putrid pens, is amazingly developed there. The poison germs find a congenial home in the mucous membrane of such hogs, and in those whose skins are so dirty that the natural perspiratory acts cannot take place, so if perspiration be checked during the prevalence of this epidemic, or the swine be exposed to sudden changes or the chilly night air, it will surely predispose them to attacks.

How to Know It.

There is a short, hoarse cough, difficulty of breathing, with panting of the flanks. The head is held in a stretched and drooping position; there is fever, a stiff, tottering gait, sometimes running at the nose, often efforts to vomit, generally constipation, but at times diarrhœa. In this form the disease is shown in the dead animal by inflammation of the lining membrane of the nose and upper part of the throat, thence to the windpipe and lungs, which are more or less solidified.

A second form of this disease has a short cough, not so pronounced as in the first form, and there is less oppression in breathing; but there is more decided paralysis in the hind quarters and the gait is more tottering. There is at first constipation, followed by a profuse and fetid diarrhea.

The disease is spending itself in the stomach and bowels. The animal arching its back and especially the loins from the intensity of the pain. The brain is often affected so there is partial or total blindness and aimless movements. So also the glands will be enlarged and sometimes scrofulous ulcers will show in different parts of the body. The dead animal shows the lining membrane of the intestines inflamed and degenerated. The spleen enlarged, dark, and soft; the liver diseased, and often water exudations in the chest and belly. The duration in either form is from five to fifteen days.

What to Do.

If the disease has progressed so as to show the latter symptoms we have described, kill, and bury the animal at once, and deeply. In any event separate the animals showing the slightest symptoms from the rest of the herd, and remove the well ones to comfortable and dry and well ventilated quarters, and give pure water and good, easily digested food. As soon as the first symptoms are discovered give an emetic as follows:

No. 1. 15 to 20 Grains powdered white hellebore,
½ Pint milk.

Mix for a full-grown hog, and let it drink; if it will not, turn it down with a horn as previously described. This having vomited the hog, in a couple of hours after give two or three grains of tartar emetic, if the trouble is in the lungs; if in the bowels, two or three grains of calomel; either medicine to be given in the half of a roasted potato or apple if the animal will eat, or to be enveloped in tallow or lard and laid on the root of the tongue and the animal made to swallow. Repeat the dose twice a day until relief is obtained. According as the lungs or bowels are affected apply to the sore place the following blistering ointment, heating over a moderate fire, for half an hour and stirring to mix:

No. 2. 1 Oz. powdered cantharides,
4 Oz. olive oil.

Rub in well and repeat the application if no blister is drawn. If the animal improves, give every day for a few days the following:

No. 3. 20 Grains sulphate of iron,
30 Grains carbonate of potash.

This, when the lungs have been the seat of disease; if in the bowels, omit the carbonate of potash. Professor Townsend thinks that in many cases the liver is torpid, and thus blood poisoning takes place. When

the attack commences with copious and dark discharges from the bowels, he recommends to give at once:

No. 4. 20 Grains podophyllin.
2 Drachms bicarbonate of soda.

Or, if constipation be present:

No. 5. 1 Ounce castor oil,
1 Drachm oil of turpentine.
Both to be given in a pint of milk or gruel.

Intestinal "Hog Cholera."

In relation to this disease, undoubtedly analogous to the one last described, Dr. James Law thinks it is a specific contagious fever of swine, attended by congestion, exudation, blood extravasation, and ulceration of the membrane of the stomach and bowels. That is, fetid diarrhœa, general heat and redness of the surface, and on the skin and mucous membrane spots and patches of a scarlet, purple or black color. It is fatal in from one to six days, or ends in a tedious, uncertain recovery.

How to Know It.

Incubation ranges from a week to a fortnight in cold weather, to three days in warm. It is followed by shivering, dullness, prostration, hiding under the litter, unwillingness to rise, hot, dry snout, sunken eyes, unsteady gait behind, impaired or lost appetite, ardent thirst, increased temperature (103 degrees to 105 degrees F.), and pulse. With the occurrence of heat and soreness of the skin, it is suffused with red patches and black spots, the former disappearing on pressure, the latter not. The tongue is thickly furred, the pulse small, weak and rapid, the breathing accelerated and a hard, dry cough is frequent. Sickness and vomiting may be present, the animal grunts or screams if the belly is handled, the bowels may be costive throughout, but more commonly they become relaxed about the third day and an exhausting fœtid diarrhœa ensues. Lymph and blood may pass with the dung. Before death the patient loses control of the hind limbs, and is often sunk in complete stupor, with muscular trembling, jerking, and copious and involuntary motions of the bowels.

Causes.

It is mainly propagated by contagion, though faults in diet and management serve to develop it. The infection is virulent, and may, it

is supposed, be communicated by the wind, and is with difficulty destroyed in hog-pens, fodder, bedding and other articles of contact.

What to Do.

Treatment should not be permissible, unless in a constantly disinfected atmosphere. Feed barley or rye, or in case these raise the fever, corn starch made with boiling water; give to drink fresh cool water, slightly acidulated with sulphuric acid. For the early constipation give a mild laxative (castor oil, rhubarb), and injections of warm water, to be followed up with nitrate of potassa and bisulphate of soda, of each 20 grains at a dose. If the patient survives the first few days and shows signs of ulceration of the bowels, by bloody dung, or tenderness of the belly, give oil of turpentine fifteen to twenty drops night and morning. Follow up with tonics and careful, soft feeding.

Prevention.

Kill and bury the diseased; thoroughly disinfect all they have come in contact with; watch the survivors for the first sign of illness, test all suspicious subjects by means of a clinical thermometer introduced in the rectum, and separate from the herd if it shows 103 or more degrees Farenheit. And as soon as distinct signs of the disease are shown *kill and bury deep*. Feed vegetable or animal charcoal, bisulphate of soda, carbolic acid or sulphate of iron to the healthy swine, and avoid all suspected food or places, or even water which has run near a diseased herd. All newly purchased pigs should be placed at a safe distance in quarantine, under separate attendants, until their health has been surely established as sound.

Contagious Pneumo-enteritis.

This disease known commonly also as "hog cholera," "purple," "blue disease," etc., is a contagious inflammation of the lungs and bowels, accompanied with red and purple blotches of the skin, the last described being one of relative forms of this disease.

Its Origin.

It is supposed to be caused by extremes of temperature and wet seasons, feeding on low or swampy soils, impure water, filthy feeding pens. Whether these causes originate the disease or not they incline the system to infections from the subtle poison which Dr. Klein, an eminent English

veterinarian, has proved to be due to a minute vegetable organism, (*bacillus*) found in the serous fluids, and tissues of animals infected. M. Roche Lubin, a French veterinary authority says the disease will disappear if proper sanitary means are used, protection from the sun and rain, well ventilated quarters, and clean bedding, often renewed, with pure water and wholesome food. We have been thus particular in quoting, to intensify what we have repeatedly said, cleanliness and care.

How to Know It.

There are two principal symptomatic forms which are important to be noticed, as follows:

The Erysipelatous Form.

The animal at first is dull, loses his appetite, lies down and moves unwillingly. He hangs his head, and sometimes makes efforts to vomit. The bowels at this time are generally constipated, the excrement being hard and dark colored; cough and difficult urination.

The next day or in a few hours, even, the characteristic symptom of the disease shows itself. This consists in the appearance of dark red or purple blotches, passing into a bluish-black color. Once seen, they cannot be mistaken. Their most frequent seats are the ears, throat, neck, breast and inside the fore legs. If he is a white hog the discolorations are very visible. With these there is often a discharge from the nose of a dark purple fluid. Soon his breathing becomes panting and labored; he is palsied in his hind quarters, and if he is driven up runs reeling with his hind legs and his head dropped to the ground. At this stage a fetid diarrhœa sometimes sets in. The fatal termination is reached in one or three days.

The Form with Malignant Sore Throat.

The general symptoms at the commencement are the same; and the appearance of the throat has that same deep red, passing into dark purple hue, which we have just noticed in the erysipelatous variety. But the obstructions to the functions of breathing and swallowing naturally produce a train of characteristic symptoms not seen in the former case. There are attempts to vomit, difficulty in swallowing, and labored breathing from the first, the sensation of choking being so distressing that the animal will sit on its haunches, like a dog, gasping for breath, opening its mouth wide, and protruding a livid and swollen tongue. Sometimes the swelling about the larynx is so sudden and considerable that the ani-

mal is choked to death in less than an hour, and before hardly any other symptom has had time to manifest itself (œdema of the larynx).

What to Do.

The cheapest remedy with animals distinctly attacked, is to kill at once, and bury deeply out of sight, to prevent contagion. If the animals are valuable, isolate them from all danger of spreading the contagion; give two to three ounces of castor oil, and as soon as it operates, give twenty grains of nitrate of potash, and twenty grains nitrate of soda,—mixed for a dose—two or three times a day. Give also powdered charcoal in the drink, and if the bowels are swollen and tender give twenty drops of turpentine in a little gruel, as may be needed. The prescription of M. Lubin, and one of the most valuable known is:

No. 6.

10 Grains powdered camphor,
1 Drachm nitrate of potash,
5 Grains calomel.

Mix and give in a little gruel three times a day, omitting the calomel after the third dose.

The local treatment should be attended to. Foment the swollen part with hot water saturated with copperas (sulphate of iron). If there is gangrene, saturate the surrounding tissues with turpentine and sweet oil, and attend strictly to the general sanitary conditions of the hospital or place where the animals, both sick and well are kept. Professor Williams advises the use of chlorate of potash as superior to all other medicines. His prescription is:

No. 7.

2 Drachms chlorate of potash,
½ Pint water.

Professor Turner, the well known Illinois scientist and extensive farmer, advises the following as having been successful with him as a preventive, and if taken in the early stages of the diarrhœa, as a cure:

No. 8.

2 Lbs. flowers of sulphur,
2 Lbs. sulphate of iron,
2 Lbs. madder,
½ Lb. black antimony,
½ Lb. nitrate of potash,
2 Oz. arsenic.

Mix with twelve gallons of slop, and give a pint to each hog; this quantity being for 100 hogs.

Our best word of advice is, if the affected hogs cannot be made to take the remedies in their food or drink, since it is a question of profit and

loss simply, then kill, bury at once, and disinfect promptly. For the means of disinfecting, see chapters on contagious diseases in cattle. If we had simply said kill and bury, our readers would not have been satisfied. Thus we have given much point to remedies; yet it will again bear repeating: In all contagious diseases of animals, of a malignant type, it is cheapest and most humane to KILL AND BURY QUICKLY AND DEEPLY. We have never found any remedy effective once it assumes a malignant form. Unfortunately, there are too many careless or pennywise persons who will not kill, and who constantly spread contagious diseases.

Charbon, Malignant Anthrax. In Swine, Splenic Fever.

It has been denied that this disease attacks swine. Since it is a blood poison known to attack various animals, and which may be communicated to man, there seems to be no good foundation for the assertion. In this country there has not been sufficient systematic investigation to separate the names of the true Anthrax from what is popularly known as hog cholera. The distinction between Anthrax (Charbon) and contagious pneumo-enteritis is stated explicitly by Dr. Klein as follows:

TRUE CHARBON.	CONTAGIOUS PNEUMO-ENTERITIS.
Period of incubation, or latency, from a few hours to three days.	Period of incubation from two to five days and more.
Easily transmissible to other species of animals.	Rarely and with difficulty transmitted to other species.
Spleen always enlarged, and often broken down.	Spleen rarely enlarged or otherwise changed.
Blood after death dark and fluid.	Blood after death of ordinary appearance.
Bacillus anthracis in the blood.	No *bacillus anthracis* in the blood, but numberless bacilly in the serum of the throax and abdomen.
Lungs and bowels frequently not implicated. Cough may be present.	Lungs and bowels *always both* inflamed. Cough always present.
The discoloration local, and of a true carbuncular appearance.	The red or purple color diffused over the surface, and of an erysipelatous appearance.

The most common form of anthrax in pigs is popularly called "white bristle." There is a carbuncular swelling, usually on the throat, presenting the features of color already described. The bristles on the spot turn white and brittle, whence the name just given. The swelling extends

inward, involving the windpipe and gullet, causing difficulty of breathing and swallowing, and at length death in convulsions through suffocation. Occasionally the true apoplectic or splenic form of charbon appears, and also the variety which attacks the tongue and mouth, both acute and quickly fatal, the apoplectic form often killing almost instantly. The flesh of all animals dying of any form of this disease, as previously stated, is poisonous, and the blood and discharges capable not only of spreading the disease among others of the same species, but also, if inoculated into the human system, of bringing on that mortal malady, "malignant pustule." The treatment, if treatment for so fearful and fatal a disease may be allowed, should be essentially the same as that prescribed in contagious pneumo-enteritis. As a preventive the recipe of Prof. Turner may be used. We advise to give medicine if only early symptoms be observed, but if animals be distinctly attacked to *kill immediately, bury out of sight, and* DISINFECT THOROUGHLY.

Inflammatory Diseases.

Swine are from their nature, and the usual manner in which they are kept, quite subject to coughs, colds, quinsy, and inflammatory diseases, especially of the lungs.

Quinsy, or Strangles.

This is a disease quite common and fatal. It is an imflammation of the glands of the throat, (tonsils) and often kills quickly through suffocation. If in feeding them there be found difficulty in swallowing, or protrusion of the tongue, and slavering from the mouth, and if there be a swelling under the neck and lower jaw, lose no time, cast the pig so he may be held firmly, and with a lancet or sharp knife, scarifying the skin of the throat deep enough to draw blood freely. Foment the parts with cloths wet with hot water and partially wrung out, repeatedly applied to induce bleeding, and reduce the inflammation, while an assistant prepares the following injection:

No. 9.

4 Oz. sulphate of magnesia,
2 Drachms oil of turpentine,
½ Pint soap suds.
Mix.

With a feather fastened to a small rod, the hog's mouth being held open, swab the tonsils and inside of the throat as far as can be reached, with equal parts of lard oil and turpentine, or if the hog will eat, give doses of two tea-spoonfuls each in a pint of gruel.

Rising of the Lights.

This is the name applied to an ordinary cold. To cure this, keep the animal warm, feed well, and rub mustard, moistened with vinegar, on the throat and chest. If it does not yield, give an ounce of tar daily, by putting a slip noose over the snout, opening the mouth, and placing the tar well back on the tongue with a narrow wooden paddle.

Pneumonia.

The symptoms of inflammation of the lungs are, quick and laborious breathing, loss of appetite, shivering of body and limbs, more or less severe cough; and the animal will not eat. The remedy is to keep the animal thoroughly warm and quiet. Rub the preparation of mustard and vinegar on the chest, and give internally,

No. 10. 2 Drachms nitrate of potash,
2 Drachms bisulphate of soda.

Mix in a pint of gruel if the animal will eat. If not turn down from a horn.

Catarrh in the Head,

Commonly called snuffles. Give the animal a clean, dry, warm pen, and feed and water well; soft food being preferable.

Disease of the Skin.

Swine are essentially liable to diseases of the skin, when kept in confinement, unless pains be taken to do for them what they cannot do for themselves, except where they have their liberty.

Measles.

Measles in swine have nothing in common with the disease of the same name in the human subject. The name is given to a parasitic affection, occasioned by the hog taking the eggs of the tapeworm, either in grazing, where they have been dropped with the excrement of the dog, or from feeding on pastures manured with human excrement. These eggs hatch and work their way into the tissues and become encysted, and if the pork of such animals is eaten, insufficiently cooked to destroy them, by man, they transfer the tapeworm. In fact, it is not certain that ordinary cooking does destroy all, therefore it is never safe to eat measly pork. The appearance of the pork is owing to the presence of minute cysts, the size of grains of barley, distributed through the muscular and other tissues.

How to Know It.

There may or may not be, but generally is, a discharge from the nose, running of the eyes, weakness of the hind parts, and general ill health. By examining the skin, small watery pimples will be found of a pink or red color. The remedy is undoubtedly beyond the reach of medicine, though a so-called specific is small doses of sulphur and saltpetre, given daily for weeks. The prevention is, to put no human excrement on grazing fields, to keep dogs clear of tapeworm by an occasional vermifuge, to bury all excrement of dogs found in the pastures, and to kill all stray and worthless curs.

The Lard Worm.

There is another parasite of the hog, the lard worm (*Stephanarus Dentatus*), from one to one and three-quarters of an inch long, which is occasionally found in all parts of the body; of swine is frequent in the liver, kidneys and fat around the ribs, and in various organs of the body, including the heart. When present in large numbers, especially in the kidneys, its eggs may sometimes be discovered in the urine, by means of the microscope. Another worm, *Eustrongylus Gigas*, also inhabits the kidneys; both may produce weakness of the back, but it would not be safe to treat for these parasites, unless this was surely determined by the microscope.

What to Do.

Do nothing. Various remedies have been prescribed, such as small doses of sulphur and salt, given daily for several weeks, or small doses of salt and turpentine. Neither have certainly been known to do any good. Minute doses of arsenic, *one-eighth of a grain*, given daily for two or three weeks, so it may be taken up by the system, would be the proper course indicated. The better way is to prevent their getting measly, by keeping the diseased ones entirely from the well ones, and the young away from the old.

Trichina Spiralis.

This minute parasite is capable of infesting all domestic animals, including man. The mature and fertile worm lives in the intestines of the animals, and the immature worm in cysts in the muscle. The eating of rats, and other vermin, and slaughter house offal is the prolific source from whence they come. The prevention is obvious. They are rarely found in western farm-raised, corn-fed hogs. There is no danger from eating pork infected with trichina, if it be *thoroughly cooked*. There is

no means of discovering them in flesh, except by the microscope. Eat none but corn-fed pork, and that cooked done. Rare cooked pork in any form whatever, is an abomination, and pork fed in slaughter house yards and distilleries should warrant their owners being sent to the penitentiary.

Mange, or Scab.

This is caused by the presence of a minute insect, *sarcoptes suis*, transmissible to man, and should not be allowed in any herd of swine.

What to Do.

As soon as discovered, rub the infested animals thoroughly with soft soap, let it remain an hour, and wash off with warm water using a good brush, let the animals dry, and apply the following ointment:

No 11.
1 Pint train oil,
2 Drachms oil of tar,
1 Drachm petroleum.

Mix with sufficient flower of sulphur to make a thick paste. This should be well rubbed in, and remain on three days. Then wash thoroughly with strong soap suds, dry, and change to quarters perfectly clean, burn all bedding, and cleanse the quarters thoroughly with carbolic acid and water. The carbolic liquor of gas works is good, of which there should always be a barrel on the farm. It is cheap. Thin down slaked lime with it, and thoroughly paint all infected places.

Lice.

If lice are found on swine, it is a sign that something is wrong. We have never seen them on well conditioned swine. When they occur from any cause, sponge the animal freely with crude petroleum, or kerosene, and give a little sulphate of iron, (copperas) one quarter drachm a day, in the feed. Let the food also be ample and nourishing. Another efficient and safe remedy for killing lice is Scotch snuff, rubbed up with lard, and applied where the lice are found.

Diarrhea.

Diarrheal affections often attack young pigs during their sucking season, generally in the first week of their life — and often causes their death. Usually the cause is due to diseased milk of the sow, either from bad food, or other causes. If so, change the food. In any case, the remedial means must be used with the sow. Place charcoal and salt where sow and pigs may get it, and prepare the following powder:

No. 12.

2 Pounds fenugreek, powdered,
2 Pounds anise seed, powdered,
1 Pound gentian, powdered,
2 Ounces carbonate of soda,
2 Pounds chalk, powdered.

Give a table-spoonful of this in the food, every time the sow is fed

Summary.

From what we have said the reader will easily perceive that we have not much faith in remedial means in contagious diseases of swine. The same holds good with any animal when once the disease is pronounced, and of a malignant type—unless the animal be so valuable that it will pay to call a veterinary surgeon. Even then in the malignant forms of the diseases described, and which are known under the popular misnomer of "Hog Cholera," killing and burying is the cheapest and altogether the most humane. The danger of spreading; the difficulty of isolation; and the next to impossibility of treating a hog too sick to eat, but never too sick to be contrary, or resist to the full extent of their power, and the ordinarily small cost of swine per head should be well considered in the treatment of swine. Use proper discretion in treating them, but do not hesitate a moment in killing, when the disease is malignant, and in ordinary cases remember that if the hog will not take his physic kindly in his gruel, better let nature and good nursing perfect the cure than to violently force medicine down. Please remember the value of good nursing in human patients. To reinforce this we may state the fact that in France, long continued experiments in hospitals, with many patients, treated under the various systems of medicine, a greater proportion recovered with *no medicine and good care and nursing*, than did under MEDICATION WITH ORDINARY HOSPITAL CARE AND NURSING. This may not have been complimentary to the hospital management, yet in no country in the world are they better or more conscientiously managed.

The necessity of good nursing in the case of swine is no less imperative than in that of human beings, and its good results are as manifest.

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